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ELECTRICITY ON THE FARM *Magazine*

APRIL, 1940

You Pay For It, Whether You Get Good Wiring or Not . . . Progress With Mow Hay Finishers, Part 2 . . . What Size Welder? . . . Small Milk Pasteurizers . . . Grown-Up Water System . . Short-Cut to Soups and Soufflés . . Patterns

19th Year . . . . . No. 4

COST OF ELECTRICITY LOST *through* INADEQUATE WIRING

WIRE SIZE A.W.G.	DISTANCE FT.	ELECTRICAL LOAD-AMPERES												
		6	10	15	20	25	30	35	40	50	60	70	80	90
#14	50	$0.10	$0.26	$0.60										
	100	0.19	0.52	1.20										
	200	0.38	1.04	2.40										
	300	0.57	1.06	3.60										
#12	50	0.06	0.16	0.36	$0.64									
	100	0.12	0.32	0.72	1.28									
	200	0.24	0.64	1.44	2.56									
	300	0.36	0.96	2.16	3.84									
#10	50	0.04	0.10	0.22	0.40	$0.62								
	100	0.08	0.20	0.45	0.80	1.24								
	200	0.16	0.40	0.90	1.60	2.48								
	300	0.24	0.60	1.35	2.40	3.72								
#8	50	0.03	0.06	0.15	0.25	0.40	$0.60	$0.77						
	100	0.05	0.12	0.30	0.50	0.80	1.20	1.54						
	200	0.09	0.24	0.60	1.00	1.60	2.40	3.08						
	300	0.14	0.36	0.90	1.50	2.40	3.60	4.62						
#6	50	0.02	0.04	0.09	0.16	0.25	0.36	0.49	$0.64	$1.00				
	100	0.03	0.08	0.18	0.32	0.50	0.72	0.98	1.28	2.00				
	200	0.06	0.16	0.36	0.64	1.00	1.44	1.76	2.56	4.00				
	300	0.09	0.24	0.54	0.96	1.50	2.16	2.64	3.84	6.00				
#4	50	0.01	0.03	0.06	0.08	0.15	0.22	0.32	0.40	0.62	$0.90	$1.22		
	100	0.02	0.05	0.12	0.16	0.30	0.44	0.64	0.80	1.24	1.80	2.44		
	200	0.04	0.10	0.24	0.32	0.60	0.88	1.28	1.60	2.48	3.60	4.88		
	300	0.05	0.15	0.36	0.48	0.90	1.32	1.92	2.40	3.72	5.40	7.32		
#2	50		0.02	0.04	0.06	0.10	0.13	0.18	0.24	0.40	0.60	0.77	$1.00	$1.26
	100	0.01	0.03	0.07	0.12	0.20	0.25	0.36	0.48	0.80	1.20	1.54	2.00	2.52
	200	0.02	0.06	0.14	0.24	0.40	0.50	0.72	0.56	1.60	2.40	3.08	4.00	5.04
	300	0.04	0.10	0.21	0.36	0.60	0.75	1.08	1.44	2.40	3.60	4.62	6.00	7.56

Beyond the allowable current carrying capacity of rubber insulated wire

TABLE IS BASED ON 500 HOURS USE OF LOAD; ELECTRICITY AT 2¢ PER KW-HR; 1940 NATIONAL ELECTRICAL CODE. J.B.Stere

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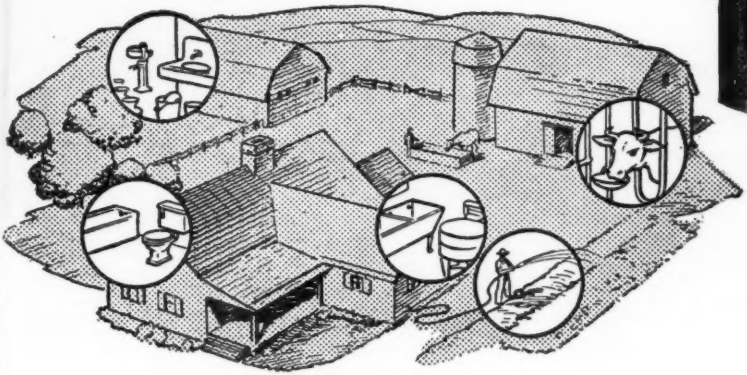

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PASTE COUPON ON PENNY POSTCARD FOR EASY MAILING

Editor's Chat

APPEASEMENT

When men or small groups through force assume to tell us where, when and what we can sing or play on our fiddles; where, when and how hard we can work; can deprive us of meat and clothing and fuel by refusing to permit other men (or pawns) to work; can call a city transportation strike if the city council does not do their bidding; ignore written contracts; defy U. S. law and courts—that's DICTATORSHIP. We went to Munich once to appease dictators. Those dictators are now dead, but the World will suffer and pay for that appeasement for generations to come. Appeasement is no way to deal with Dictators—political, capitalistic, labor or gangster.

THERE YOU HAVE IT

In my February Chat I speculated on what would happen to farming if farm labor followed the pattern of the automobile workers union. It happened.

The New York *Herald-Tribune* for Sunday, February 17 had an account of the Miller Dairy Products and the Norman Dairy both of New Canaan, Conn., and each employing nine men who joined the teamsters' union. The union demanded for them a 28% increase in pay, 66% increase in commissions, a five day week and prohibition of the owners doing any manual labor. The dairies figured they would lose money if they granted the demands, so refused. On Sunday, January 27, 250 pickets massed in front of the Miller Dairy. The next day the dairy went out of business. A week later the Norman Dairy followed.

Some of the national strikes have been settled. The Government, after encouraging the wage demands, finally had to grant price increases to enable industry to survive. Is everybody happy? No. Here's what we have.

As fast as one strike is settled by granting higher wages, two more start up. It is only reasonable to expect that strikes will continue until all unionized labor groups get their 18½c per hour.

Hundreds of millions of dollars have been lost in wages by the striking workers. The communities in which they live have lost that much business. Much of the wartime savings of many workers is gone.

The business of the country has been thrown completely out of joint. There is no certainty when products will be available. Black markets got a new boost.

Whether Chester Bowles admits it or not, prices must go up to cover costs. Either that or capital will be forced out, the Government will take over and we will pay the increases in taxes—and have State owned industry. Figure it for yourself, right back to the raw materials. You will find that the cost of nearly everything we buy from BVD's to tractors is made up of 50 to 90% labor and services. Increase labor costs and product costs must go up.

Then where will the strikers be? The $8.50 per day man may be drawing $10, but each of those dollars will buy less than it did before. In buying power he will be little better off. Yes, a little. Maybe 40c a day. And that 40c will be paid by the unorganized school teachers, clerks and old folks living on savings—the people who pay the higher prices but get no increase. And Mr. Citizen, if we are wise and just, we will hasten to give the 18½c to the clerks and schoolteachers before some budding young dictator-organizers *take them* in tow by strong arm methods.

As a nation the strikes have brought us one turn up the inflation spiral, one step down in American freedom, and a little closer to State socialism, facism or communism, whatever you want to call it.

This greed and selfishness is not confined to America. The whole world is aflame with the spirit of "grab-while-the-grabbing's-good." Let us bear in mind, however, that if we cannot control ourselves at home we can hardly hope to hold in check other countries and races that have the same motives but on a national scale.

THE SUN STILL SHINES

We do a lot of thinking about troubles. We need to be cognizant of them and do something about them to overcome them. But, look away. The sun still shines; the greening fields and budding trees tell us life is being kindled anew. Lambs, chicks, pigs, blossoms, opportunities are still with us in this grand country of ours—and it still is ours to do with as we will, collectively. There is a bright, sunny side if we occasionally get our chins up and look in the right direction.

George W. Kable

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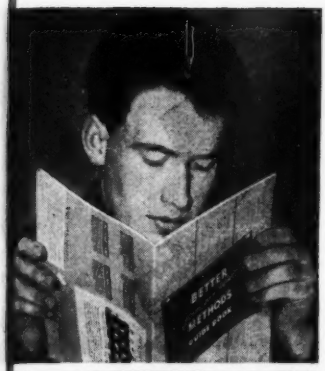

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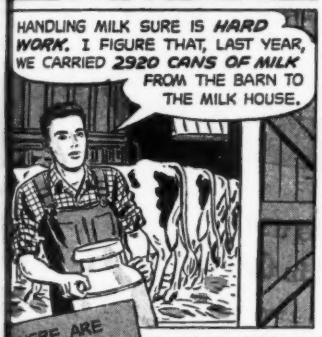

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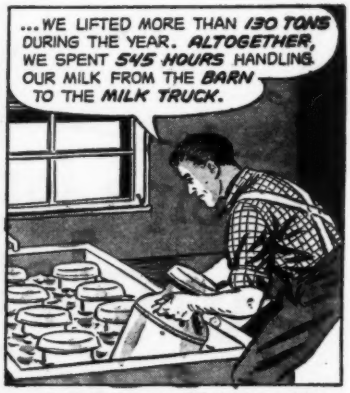
...WE LIFTED MORE THAN 130 TONS DURING THE YEAR. ALTOGETHER, WE SPENT 545 HOURS HANDLING OUR MILK FROM THE BARN TO THE MILK TRUCK.

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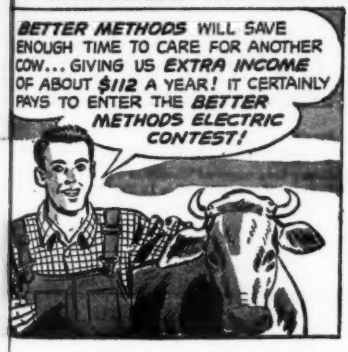
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ELECTRICITY ON THE FARM Magazine

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Developments in Mow Hay Finishers—Part 2

How Hay Cures in the Mow, Amount of Air Needed, Pressures, Types of Blowers and Fans Most Satisfactory. Good Hay Quality and Molds, Use of Heat, Finisher Operation for Best Results. A Proposed Future Hay Finisher

By **GEO. W. KABLE**

PART 1 of this article told of several types of air distribution systems in mow finishers, gave pointers on construction of duct and slatted floor systems to save power and get more air through the hay, and reported on air leakage around the hay and methods being used to prevent it.

How the Hay Cures

After some ten years of research and observation, engineers have developed a theory of what happens when air is blown up through a mow of partially cured hay. Mr. C. E. Trudden of Allis-Chalmers suggests that the hay dries progressively upward as indicated in the accompanying sketch, the curing layer being possibly one foot thick.

Amount of Air Needed Air Pressures

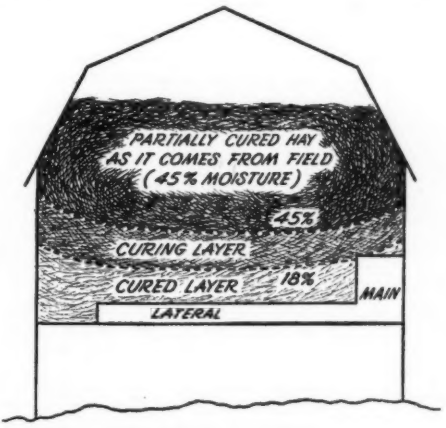
When the first mow hay finishers were put in, the amount of air recommended was 10 cfm (cubic feet per minute) per square foot of mow space. A mow of 1,000 sq ft would require a 10,000 cfm blower. That was based on a depth of hay of about 8' and a moisture content of 35 to 40 percent. Now with hay being put in mows to a depth of 25' or more and at moisture contents that we hesitate to mention, the old recommendations fall down completely. The purpose of the air is to carry the moisture out of the hay. The deeper the hay and the wetter it is, the more air must be supplied. And the faster you take out the water the better the quality of hay. The Muffly Farms in Pennsylvania used 92 cfm per sq ft for baled hay 10 bales deep last summer. In the future, good designers will insist on knowing the depth of hay to be put in, its moisture content and density before computing the cfm per sq ft required. From figures obtained from a number of experimenters, here is a summary of approximate air quantities and air pressures that have been used:

Long Hay. 10 to 25 cfm per sq ft and ½" to 1" static pressure for hay 8' to 12' deep.

15 to 30 cfm per sq ft and ½" to 1½" pressure up to 25' depths.

Chopped and Baled Hay. 15 to 50 cfm per sq ft and ½" to 3" pressure up to 16' of chopped hay.

Inches of pressure are measured by the height to which a column of water is raised by the air pressure. One inch of pressure equals about 0.036 (less than 1/25) pounds per square inch.



Sketch of what we think takes place in a mow hay finisher filled with drying hay. Air is being blown through the hay under pressure from below. The bottom layer dries first, the moisture removed being carried up through the hay and discharged at the top. After the bottom hay is cured, the curing layer moves upward. The top layer is the last to dry. In the meantime that top hay remains in about the same condition as when it was put in. The depth of the curing layer and its movement upward will depend on the amount of air being forced through the hay, its temperature and dryness. Conceivably it could be the full depth of the hay. The moisture percentages indicated in the sketch are assumed as typical. They will vary with different hays and atmospheric conditions.

The pressure against which a blower must work depends upon the resistance to the air flow through the duct system and through the hay and upon the speed of the air through the system. If the depth of hay is doubled, the resistance to the air flow is doubled. But there should also be twice as much air to get the moisture out at the same rate. Now if the amount of air is doubled, the pressure is increased about *four times*. That means it will take about four times as much power to deliver double the amount of air, and nearly eight times as much if you also double the depth of the hay.

This fan pressure and volume presents a problem which we must face on rural power lines. Most rural lines are constructed so they will handle 5 hp motors satisfactorily. When we get up to depths of hay of 20' to 25' in large mows, we must either be satisfied with slower curing of the hay or we will need 10 and 15 hp in motors, which cannot be used on some rural lines. Prospective users of hay finishers should always consult their power suppliers before proceeding.

It is not difficult to see also that it is highly desirable to have a duct system with as little resistance to air flow as possible as perhaps half or more of the power is used in forcing the air through the ducts.

Air goes through green hay with less resistance than through the same depth of hay after the moisture is re-

moved and it has settled. From green hay to dry the settlement is about 1 foot in 4.

Use of Heat

In some sections of the country a little supplementary heat has been used to speed the curing in mow finishers. There are installations in Virginia, Ohio, Minnesota, Oregon and Texas. Any rise in the temperature of the incoming air, even 2° or 3°, will cause it to pick up more moisture and thus speed the drying.

Frudden estimates that increasing the temperature 10° will decrease the drying time 30 per cent. Heat adds considerably to the cost and some to the fire hazard, but it does improve the hay quality.

Types of Blowers

Three types of blowers are commonly used in hay finishers. First to be used was the multi-vane, centrifugal blower. It has a squirrel-cage type of rotating element with many narrow blades. It is used in air conditioning and is available from a number of manufacturers. What is known as the backward-curved blade centrifugal blower is somewhat similar but has fewer blades, is much heavier in construction and is recommended where higher pressures are needed. Because of its greater size and weight, it costs more. The third type and the kind which was installed in greatest numbers last year is the propeller or axial-flow fan. A typical 5 hp unit was shown on the March cover. The axial flow and the multi-vane centrifugal units are similar in price. Axial-flow fans have been used increasingly because the load on the motor is almost constant regardless of the amount of hay on the ducts. Multi-vane centrifugal types tend to overload the motor when there is little or no hay on the system unless dampers or adjustable speed pulleys are used. Some of these blowers have been supplied with ammeters in the motor circuits to tell when the dampers or pulleys need adjusting. The backward-curved blade centrifugal is a non-overloading type.

Hay Quality — Mold

Just what conditions produce high quality hay in a mow finisher have not been too well understood. The past year's results have brought us a step along the way. We know we save most of the leaves and much of the green color by getting the hay into the mow before the leaves dry enough to shatter. We thought the green color was an indication of carotene content, but Dr. H. A. MacDonald of Cornell says this is not always true. He says that carotene in barn-cured hay is much less than in freshly-cut green hay or oven-dried hay, but it is about 10 times greater than in ordinary field-cured hay. Everyone seemed to be agreed that the faster the moisture could be taken out of the hay, the better would be the quality—including carotene content, digestible nutrients, aroma and palatability.

An overlaid slatted floor in a southern Michigan farm barn. Such an air distribtuion system is suitable for chopped, long or baled hay. The side main is at the left.

There was mold in hay on a large number of mow finishers last summer. It was a very bad year to make hay either inside or outside the barn. Long spells of rainy and cloudy weather with high humidities made it difficult to get the hay in without a high moisture content and even more difficult to get the moisture out with so little good drying air. The mold was pretty well isolated in the top layers of hay and in excessively compacted spots, except where very wet hay was covered up before it was cured. If you will refer to the sketch showing how hay cures at the beginning of this article, you will understand why many farmers found some beautiful hay down underneath, after the top layer was removed. That top layer does very little drying until all the hay below it is cured. It just lays there cold and damp and at fairly uniform temperature—ideal conditions for mold growth.

Prof. Jennings at Cornell in his studies of mow curing under laboratory controlled conditions found that there was very little mold in hay that was cured down to 10 per cent moisture in 7 days or to 20 per cent moisture in 4 days. If the curing took a longer period, there was likely to be mold present. Curing time can be shortened by putting on less hay, curing it more in the field, increasing the air supply or providing heat. In the laboratory, hay 4 feet deep molded with less than about 11 cfm per square foot of floor but was of good to excellent quality when 20 cfm or more was used. Because the top layers of hay do little curing when first put in, Prof. Jennings thinks one will get higher efficiency—better curing—from his mow drier if hay is put in a little at a time every day rather than an 8-foot or deeper filling all at once.

From tests that have been made it seems that mold growth is not dependent so much upon the initial moisture content of the hay or its drying temperature as on getting the moisture out of the hay quickly.

Mr. Andy Hendrix, USDA, who is conducting research at Virginia Polytechnic Institute, believes that mold formation under some conditions could be prevented if the blowers are kept running continuously. When the blower is stopped, the moist hay heats. Then when the blower is started again, the warm moist air is carried upward through the cooler top layer of hay where it condenses, leaving that hay wetter than before. It then remains wet until all the hay below it is cured and the outgoing air is full of moisture and cannot pick up any more.

There is much we do not know about molds. We do know that there are many kinds and that they grow at different temperatures. I just ate some blue mold cheese for lunch. It takes mold to make it. Penicillin is made from mold. Prof. P. C. Miller of Ohio State University told of some moldy top hay that threw out as manure. The beef cattle on pasture gobbled it all up and seemed to like it. Quite a few dairymen have fed hay with some white mold on it this year. I have heard

ot no bad effects. Some molds are reported to be injurious. There is on the market a substance known as Security Compound whose inventor claims it will prevent mold on damp hay if sprinkled over the hay at the rate of 1 pound per ton (costs about 15c per lb.) as it is being put in the mow. We need to know more about molds, but for the time being we should avoid them in hay if possible.

Finisher Operation

Agricultural engineers generally still recommend that long hay be curred in the field to 45 per cent moisture and chopped hay to 35 per cent before it is placed on the mow finisher. They also prefer putting small quantities of hay in the mow each day rather than putting it in 6' to 8' layers once a week.

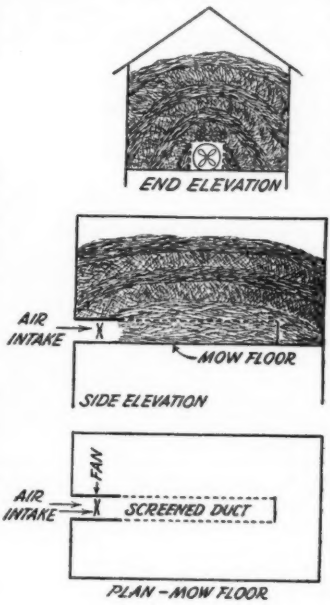
Most engineers prefer to keep the blowers running continuously day and night until the hay is nearly cured. If the fan is stopped and the hay "gets limp" and wet from condensation, it packs and it is very difficult to get air through it. On the other hand, J. B. Stere of West Penn Power Co., Pittsburgh, who has made many finisher installations, says that farmers who formerly did not have time clocks for running the blower periodically at night, put them in last year. The reason was the air was so wet at times that continuous blowing was impossible without putting moisture back into the hay. It was necessary, however, to blow for several short periods during the day to keep the hay from heating.

Dr. H. J. Barre of Purdue University recommends placing a layer of hay over the entire mow rather than a double depth over half the mow, because much more air will go through the thinner layer with the same amount of power.

Long-Cut Hay Recommended

For chopped hay in the mow, Prof. Duffee insists that choppers must work efficiently at a specified 2" length of cut (actual cut 4"). Finer material is easily stratified when being blown into the mow. We believe that hay cut in lengths up to 6" or even 8" would give the advantage of chopped hay handling, storage and feeding and would cure more satisfactorily in the mow. It was suggested that a Finnigan distributor head might improve distribution in the mow. Dawson Womeldorf of Public Service Co. of Northern Illinois said he liked chopped hay they put in with an elevator much better than that put in with a blower. It was more uniform and air went through it better.

Where hay is placed on a duct system it is highly important that the hay be spread uniformly without tramped or wet compacted spots and with as little separation of leaves and stems in chopped hay as possible. Air is tricky and will always find the easiest way through. Uniform density and depth is necessary for uniform drying.



A suggestion to *research men*. One large duct down the center of the mow covered with 1" mesh heavy screen wire and having the blower in a boarded-up extension to this duct at one end. No laterals. Hay would be blown or piled over the center duct taking somewhat the shape of the contours shown, as the mow is filled. The air travel distance laterally and vertically through the hay would be about equal, tending to give even air distribution. Very little tramping of the hay and little labor in mowing back. No pressure losses through laterals or leakage up walls. This system has not been tried and *we do not advocate it for farms* until it has been proved under controlled experimental conditions.

Many farmers impaired the effectiveness of their hay finishers last summer by not providing large enough openings for the moist air to get out of the barn after it passed through the hay. Ten thousand cubic feet of air each minute is a lot of air. If you try to force it out through cracks or small windows you will get less air through the hay.

Long, Chopped or Baled Hay?

There are an increasing number of mow installations for baled and chopped hay—chopped a little in the lead. The reason is ease in handling in the field and mow. It may also be possible to finish curing baled hay without a lateral duct system by leaving air passages between the bales. Long hay installations still predominate, and probably will for some time to come. If better methods of handling long hay into the mow with blowers or conveyors are devised, long hay curing will continue to predominate. Mow curing is *primarily* a system for improving the feeding quality of hay that is to be fed on the farm.

A Future Mow Finisher

While we would not suggest that any farmer try it, we cannot help wondering whether the time will come when we will just build a large open framework down the center of the barn covered with 1" wire mesh as an air duct and pile the hay—long, chopped or baled—over this duct without trying to mow it away to the sides until the mow is nearly full. With a rounded pile over this duct, the distance the air would have to travel upward or to the sides or the ends through the hay would be about equal. It might give more uniform distribution of air through the hay than any present system of laterals. With the fan located in one end of the duct and blowing into it, there would be practically no friction or pressure losses or air leakages except those through the hay. That seems too simple. Some research agency equipped for studying air movements should try it.

Electric Lines Near Wells Dangerous

Several electrocutions have occurred in pulling pumps and piping from wells into electric lines overhead. Regulations are being recommended by the Minnesota Electrical Inspection Association to the Industrial Commission relative to the safe location of electric lines near water wells.

The population per square mile of arable land in Japan is 2,430; in Germany, 587; in Italy, 500; in the United States, 102; and in Russia only 68, according to a Twentieth Century Fund report.

YOU PAY FOR IT

Whether You Get Good Wiring or Not

Save this—

Big Wires Are Needed for Big Loads. You Either Pay for Big Wire and Get It or You Pay for Big Wire by "Getting It in the Neck" with Small Wires That Waste Your Electricity

By J. B. STERE

NOTE. *Did you ever try to drive a big load of hay down a narrow lane with an Osage Orange hedge on either side? You lost hay! The* BIGGER *the load the more hay you lost; the* NARROWER *the lane, the more hay stuck to the hedge; and the* LONGER *the lane, the less hay you had at the end of it.*

Electric wires are like that lane. The bigger the load you try to drive through a wire, the more kilowatt-hours you lose; the narrower the wire, the more kw-hrs get hung up on the way, and the longer the wire, the less electricity you have at the end of it. And electricity ain't hay, either.

Mr. Stere tells you in this article exactly what it costs in money to use small wires. Do not let a contractor or dealer talk you down on correct wire size in order to get your job at a lower price. He either does not know wiring, or he is short-sighted or willing to sacrifice your interests to get your money. You will pay in the end.—EDITOR.

THE selection of the proper size of wire to serve electrical equipment is a matter which requires careful attention. Frequently there are wide variations in wire sizes recommended by different persons interested in wiring. These disagreements which confuse the purchaser are usually due to lack of complete information or to basing recommendations on some, but not all of the factors that should be considered.

Points that must be considered for properly engineered wiring are: Safety, present and future electrical load, diversity of use, voltage used, voltage drop in wires, physical strength of wire and wire costs.

The total cost of a wiring job not only includes the cost of the wire and labor for installation, but also the cost of electricity lost in the wiring on the customer's side of the electric meter. The electrical energy lost is due to the electrical resistance of the wire. It is similar to friction loss in mechanical equipment. This loss of electrical energy occurs whenever current is flowing in the wires and it cannot be eliminated. Selecting the smallest size wire that will satisfy the engineering requirements is often false economy. **The most economical wiring installation is one where the cost of electricity lost in the wires during their useful life is equal to the investment in the wire.**

COST OF ELECTRICITY LOST IN VARIOUS SIZES OF WIRE FOR DIFFERENT LOADS AND LENGTHS OF RUN

BASED ON: 500 HOURS USE OF LOAD AND ELECTRICITY AT 2¢ PER kw-hr

WIRE SIZE A.W.G.	LENGTH OF RUN FEET	LOAD IN AMPERES												
		6	10	15	20	25	30	35	40	50	60	70	80	90
#14	50	$ .10	$ .26	$ .60										
	100	.19	.52	1.20										
	200	.38	1.04	2.40	BEYOND THE									
	300	.57	1.06	3.60										
#12	50	.06	.16	.36	$ .64									
	100	.12	.32	.72	1.28	ALLOWABLE								
	200	.24	.64	1.44	2.56									
	300	.36	.96	2.16	3.84									
#10	50	.04	.10	.22	.40	$ .62		CURRENT	(AMPERES)					
	100	.08	.20	.45	.80	1.24								
	200	.16	.40	.90	1.60	2.48								
	300	.24	.60	1.35	2.40	3.72		CARRYING						
#8	50	.03	.06	.15	.25	.40	$ .60	$ .77						
	100	.05	.12	.30	.50	.80	1.20	1.54						
	200	.09	.24	.60	1.00	1.60	2.40	3.08		CAPACITY OF				
	300	.14	.36	.90	1.50	2.40	3.60	4.62						
#6	50	.02	.04	.09	.16	.25	.36	.49	$ .64	$ 1.00				
	100	.03	.08	.18	.32	.50	.72	.98	1.28	2.00		RUBBER INSULATED		
	200	.06	.16	.36	.64	1.00	1.44	1.76	2.56	4.00				
	300	.09	.24	.54	.96	1.50	2.16	2.64	3.84	6.00				
#4	50	.01	.03	.06	.08	.15	.22	.32	.40	.62	$ .90	$ 1.22	WIRE	
	100	.02	.05	.12	.16	.30	.44	.64	.80	1.24	1.80	2.44		
	200	.04	.10	.24	.32	.60	.88	1.28	1.60	2.48	3.60	4.88		
	300	.05	.15	.36	.48	.90	1.32	1.92	2.40	3.72	5.40	7.32		
#2	50		.02	.04	.06	.10	.13	.18	.24	.40	.60	.77	$ 1.00	$ 1.26
	100	.01	.03	.07	.12	.20	.25	.36	.48	.80	1.20	1.54	2.00	2.52
	200	.02	.06	.14	.24	.40	.50	.72	.56	1.60	2.40	308	4.00	5.04
	300	.04	.10	.21	.36	.60	.75	1.08	1.44	2.40	3.60	4.62	6.00	7.56

The accompanying chart provides a ready means of getting down to "brass-tacks" on costs in selecting wire sizes. To apply the chart to any given set of conditions one should know: (1) *Length of Run*—the distance the wires must be run from the source of power to the point of use.

(2) *Load* in terms of amperes (current). Full load motor current is found on motor nameplates. Heating and lighting loads are usually indicated in watts. Divide watts by rated volts to determine amperes. Example: 1150 watts ÷ 115 volts = 10 amperes.

(3) *Hours equipment is used*—the total operating time of the equipment during the year. For assistance in determining operating time of equipment with which you are unfamiliar, consult people who have used it or your power supplier.

(4) *Cost of electricity*—average cost per kilowatt hour.

(5) *Wire cost*—includes cost of necessary wire (2 or 3 wire circuit)

for the length of run. Does not include labor, insulators, etc.

Where the hours of use are just 500 per year and the cost of electricity is just 2¢, the cost of electricity lost in the wires can be read directly from the chart. Where the hours of use and cost of electricity differ from those on which the chart is based, the chart can still be used by adjusting for the differences. For instance in Example 1, the cost of electricity lost in No. 14 wire for a length of run of 200 ft. and load of 10 amps. as shown in the chart is $1.04. This cost is based on 500 hours use at 2¢ per kw. hr. The conditions in Example 1, however, are 1,000 hrs. use or double the time and 4¢ per kw. hr. or twice the unit cost. The cost of electricity lost in one year in Example 1 is four times $1.04 or $4.16.

EXAMPLE 1

LENGTH OF RUN ____ 200 ft.
LOAD ____ 10 amps.
USE OF LOAD IN ONE YEAR ____ 1000 hours
COST OF ELECTRICITY ____ 4¢ a kwh.

WIRE SIZE	WIRE COST	COST OF ELECTRICITY LOST IN ONE YEAR	REMARKS
#14	$5.00	$4.16	Equipment will not perform satisfactorily.
#12	$7.00	$2.56	Equipment will not perform satisfactorily.
#10	$9.00	$1.60	Equipment will perform satisfactorily but cost of electricity lost is excessive.
#8	$13.00	$.96	Using #8 instead of #10 wire would require a further expenditure of $4.00 but would result in a saving of $.64 per year in cost of electricity. This saving in 6¼ years would pay for the additional cost of the larger wire.

Use of #8 is recommended.

EXAMPLE 2

LENGTH OF RUN ____ 100 ft
LOAD ____ 25 amps
USE OF LOAD IN ONE YEAR ____ 750 hours
COST OF ELECTRICITY ____ 2¢ a kwh.

No 10 is smallest size of R.C. wire to carry 25 amps safely.

#10	$4.50	$1.36	Equipment will not perform satisfactorily.
#8	$6.50	$1.20	Equipment will perform satisfactorily but cost of electricity lost is excessive.
#6	$8.50	$.75	Using #6 instead of #8 wire would require a further expenditure of $2.00 but would result in a saving of $.45 per year in cost of electricity. This saving in 4⅔ years would pay for the additional cost of the larger wire.
#4	$10.50	$.45	Savings in cost of electricity does not justify the additional investment required in using the larger wire.

Use of #6 is recommended.

Choosing Wire Size

After tabulating the cost of electricity lost for each of the possible sizes of wire to be used, you can decide for yourself which is the most economical size to use. The cost figures in bold type in the table represent an electricity loss so great it will cause unsatisfactory performance of equipment. Avoid the use of the size wire that is shown in boldfaced type as these costs will be even greater than those shown in the chart because your motors, heaters, etc. will operate at low efficiency.

For conditions such as shown in Example 1, the loss of electricity in No. 14 and No. 12 wire is sufficient to cause unsatisfactory performance of equipment, as indicated by the bold type cost figures. When No. 10 wire is used to carry 10 amps for 200 feet, the equipment will perform satisfactorily, but before selecting this size, consider the use of the next larger size. The savings in using No. 8 instead of No. 10 over a period of 6¼ years would pay for the additional cost of the larger wire. Obviously in a case such as Example 1, No. 8 wire should be used. To test the soundness of this conclusion, multiply the cost of electricity lost in one year by the years of useful life of the wire. When this cost is equal or nearly equal to the cost of the wire, it is the most economical size of wire to use. In Examples 1 and 2, it is assumed that the useful life of the wire is 14 years.

The average useful life of outdoor wiring ranges up to 15 or 20 years. Actually it is considerably less than this because the wire has to be replaced with larger sizes to accommodate additional uses of electricity.

In the presentation the *cost* of inadequate wire sizes has been stressed. It should be borne in mind, however, that in addition to the electricity lost in wires there are added handicaps in wire that is too small. Lamps will not develop their full brightness or give the light they are designed to produce; heating devices such as brooders will fall short of the warmth the chicks should have; and motors may get overly hot or fail to come up to speed. Where electricity is to be used, it is just good business to provide wires large enough to carry it adequately.

4-H Sheep Shearing Contest

The Committee on National 4-H Contests and Awards has just announced the establishment of a National 4-H Club Sheep Shearing Contest to help promote better shearing methods nationally. The contest will be held in connection with the 1946 International Livestock Exposition, Chicago. The donor of college scholarships and cash awards is the Chicago Flexible Shaft Company, sponsors of the contest.

The contest is limited to two 4-H Club members per state between 14 and 21 years of age on January 1, 1946, and who have won a state, district, or county 4-H shearing contest.

The Stewart electric Shearmaster will be used in the contest.

For additional information, see your County Agent or write the Chicago Flexible Shaft Company, 5600 Roosevelt Road, Chicago 50, Illinois.

To Tighten Loose Screws

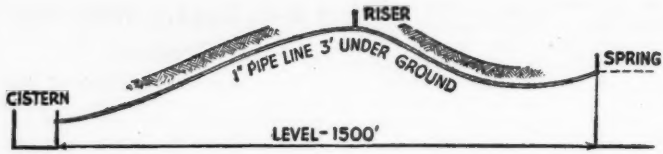
Is there a screw loose in your car or refrigerator or cupboard door latch. Remove the screw, fill the hole with steel wool and tighten the screw back in place. It stays tight.

Water Fog Kills Oil Fire

Last winter a freight train was wrecked in New Haven, Conn. and 10,000 gallons of burning gasoline flooded the right-of-way in the mercantile district. The Fire Department equipped with fog nozzles and other fog equipment had the fire confined to a 30 ft circle in 25 minutes and completely extinguished in 40 minutes. Large streams of water would only have spread the flames.

Many portable fog units for fire fighting were used at air fields durthe war. Some of this equipment may be declared surplus and would be excellent for small towns and rural fire fighting. Watch for surplus property releases.

M. M. JOHNS of the University of Tennesse made a survey of farmers who used hay finishers in 1945. Of 27 who answered, one farmer said he did not like his results; 50 per cent said the extra hay value would pay for the finisher in one year; 25 per cent said it would be paid for in two years; 25 per cent said three years.



Grown-Up Running Water

First a Creek, Then a Spring and Siphon, Next a Windmill, and Finally a Water System. Stopping "Pipe Noises" at Night

By **PAUL Z. ZIEMKE,**
Oak Ridge, Tennessee

OUR farm buildings are located on a creek that supplies water for the garden, pasture and combination duck pond and emergency fire supply. To secure an ample supply of pure water for household use and livestock we figured the relative costs of bringing water from a spring or drilling a well through solid rock. We decided on the spring. It is up the creek about 1,500 feet in a straight line from the house.

Following the winding creek with the pipeline from the spring was ruled out because of the distance and the rocky creek-bed. To come direct from the spring to the house we would have to carry the pipe over a little hill. That is what we did. The pipe was buried three feet deep, which is ample to protect it from frost in Tennessee. The hill being higher than the spring, we had to siphon the water over it. It was done very simply.

When the pipe was being laid we put in a tee and riser at the highest point of the hill. This was for priming the siphon. After the pipe was all laid, we plugged the lower end at the house and the end at the spring and then poured water in through the riser at the high point until the pipe was full. We then screwed a cap on the riser pipe and unplugged the two ends. The water started flowing and has continued to flow for 18 years.

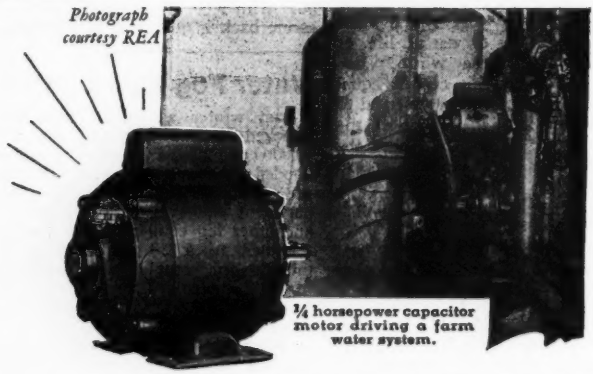
The 1500 feet of pipe is 1 inch in diameter and ends in a cistern at the house. From the cistern, water is supplied to the residence and the milk-house.

Later when we wanted greater convenience, we installed a windmill pump which raised the water from the cistern to four 50 gallon drums which were connected together in the barn loft. This gave us water under some pressure at the house.

As soon as electric service came our way we purchased a 1 horsepower, 750 gallon-per-hour water system which also gets its supply from the spring-fed cistern. It is complete with automatic controls and gives us a high pressure supply of spring water.

There was one thing about the new pressure system that distressed us. In the wee hours of the morning we would hear a rattling of the water pipes that woke us up. We found it was the cows, and particularly the bull in his box stall moving the float valves on the individual drinking cups. The trouble was corrected by cutting a section out of the 1-inch line serving the barn and putting in a short piece of high pressure rubber hose. That completely isolated the shock from the barn and stopped the noise.

Photograph courtesy REA



¼ horsepower capacitor motor driving a farm water system.

Get City Water Convenience with a

CENTURY MOTOR DRIVING YOUR WATER PUMP

Century electric pump motors are a dependable source of power for farm water systems. When automatically controlled by a pressure float or switch they keep water available when and where you want it. Add the dependability and quiet operation of Century motors to the convenience of your water system.

Other types of Century motors are built in sizes from 1/20 to 600 horsepower to handle any electrically powered farm equipment. When you select a motor-driven machine or buy a replacement motor, ask for a Century.

CENTURY ELECTRIC COMPANY, 1806 Pine Street, St. Louis 3, Mo.

Offices and Stock Points in Principal Cities

Century C MOTORS

465

PLANNING A WATER SYSTEM IS A BUSINESS PROPOSITION!

Talk things over with YOUR DEMING DEALER!

● The idea that an automatic water system is a *luxury* is proved wrong by thousands of successful farmers who make FULL USE of running water for increasing profits. Of course, they get the PLUS values of better health, greater convenience, and more comfort for their families and help.

But wherever you see a farmer making FULL USE of running water, *it's a dollars and cents business proposition.*

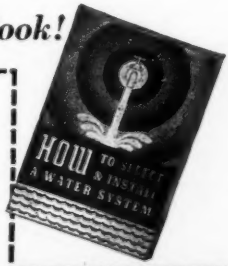
On that basis... *and it's the right basis!*... you want to talk things over with someone who can help YOU to plan an automatic water system that can make money for you.

Your Deming Dealer is backed by a long established line of dependable pumps and water systems of PROVED quality, construction, performance and endurance.

The Deming Jet Water System illustrated is a good example of what it takes to start making money through the FULL USE of running water. Features of this successful water system are described in Bulletin J-4900-C. Write for it and, at the same time...

KITCHEN · BATH ROOM · LAUNDRY · DAIPY BARN · MILK COOLING · HOG HOUSE · POULTRY HOUSE · GARDEN · LAWN · FEED LOT · IRRIGATION · FIRE PROTECTION

Ask for this FREE Guide Book!



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Please send FREE copies of Bulletin J-4900-E and the guide book "HOW TO SELECT AND INSTALL A WATER SYSTEM!"

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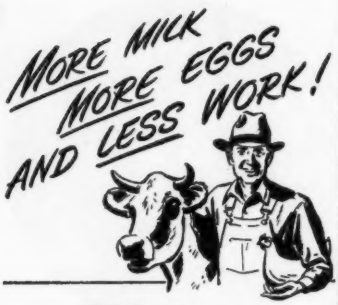


With an . . .

F&W

WATER SYSTEM

Farmers everywhere say F&W Water Systems help step up production. End tedious labor, too, save time for important work. An F&W system provides plenty of running water for kitchen, and bathroom—as well as barns and milk house.

Behind every dependable F&W system is 80-years' experience. *Every* pump is pre-tested at the factory, assuring full rated capacity and pressure. Models for shallow, medium and deep wells. Sizes to meet all home and farm needs. Ask your dealer about F&W systems or write.

FLINT & WALLING MFG. CO., INC.
495 OAK STREET, KENDALLVILLE, IND.

WE BOUGHT AN F&W BECAUSE IT'S SO DEPENDABLE!

(Right) F&W Centrifugal System. No belts. No gears. No pulleys.

(Left) F&W Reciprocating System. May be used with your own motor.

What Size Welder?

IF you are thinking about a farm welder there are several questions you should ponder before you spend your money. Do you really need a welder, or are there plenty of them near enough to you so you can have your work done promptly and possibly cheaper and better? That's No. 1. Number 2 is, are you reasonably skillful mechanically and willing to go to a training school and learn how to weld right? And, No. 3, if you are going to buy a welder, should you get a Paul Bunyan size, or figure out a size that fits your mechanical needs, your rural line size and your purse?

The No. 1 question of need could be argued from different angles all day. You will have to be the judge whether you should invest in a welder.

Did you ever watch a dry fly fisherman hook trout with a 5½ ounce fly rod? Or watch an expert at the fair cut your silhouette out of black paper with a scissors? It's easy for them. It is even fun. But *you* try to drop that fly in an eddy 40 feet away under a branch, or cut out your wife's profile. That's different. It takes "know-how" and skill that comes from native ability and practice. That applies to welding, also. If you are going to buy a welder, make up your mind in advance that you are going to spend enough time and effort to learn how to use it and to do a good job. Some manufacturers and some dealers conduct good training schools. The Agricultural Engineering Department of your state agricultural college may give a short course; or local welding shops may give training.

Welders are made in sizes from about 40 amperes maximum output up to 1,000 amperes. Quite a few farmers have purchased 250 and 300 ampere welders. Some of them are in trouble because their rural lines and transformers are not heavy enough to carry the load. Maybe they are having to pay a monthly service charge just for the privilege of having that welder on the farm. Their own farm wiring is not large enough to feed the electricity to that welder that it needs.

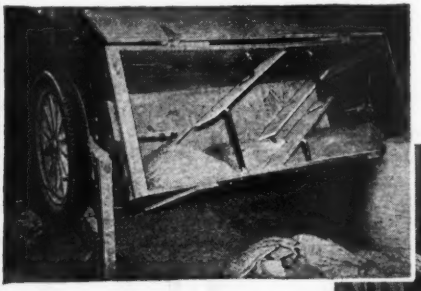
Facts About Welder Sizes

What are the facts about welder sizes? An illustration will help explain them. If you are breaking a thousand acres of land and clearing it of stumps, you might buy a 100 horsepower track-layer tractor and 4-bottom plow. If you had only 100 acres, you could do it quicker and easier with that big outfit, but it would not pay you to buy it. You would either hire the job done or do it yourself with smaller equipment. It would take longer with a 1-plow tractor, but you could not do a good job and the small tractor is easier to move around on small jobs, takes less shed room and gasoline. You

. . . . . (More on page 32)

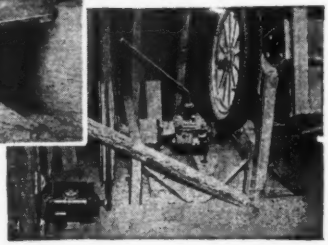
Improvised Feed Mixer

The accompanying illustrations show a batch type feed mixer built by Walter Huffman of Wasseon, Ohio for mixing feed for cows, hogs and chickens. The mixer box is



30"x30"x6' long and will mix 10 to 15 bushels at a time. The baffle boards shown inside the box push the feed from end to end and the square box turns it over as it rotates, giving it a good mixing.

The construction is simple but rugged. The drive is from a friction pulley against the old Ford wheel. Further speed reduction is obtained through the old car transmission and from the small motor pulley to the rim of the old car wheel. The motor is ½ horsepower.

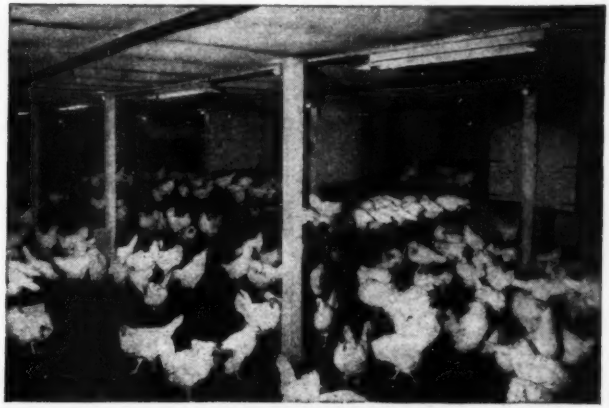


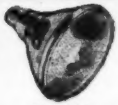
SEE HOW THESE G-E LAMPS CAN HELP

make farming more profitable for you

G-E Germicidal lamp

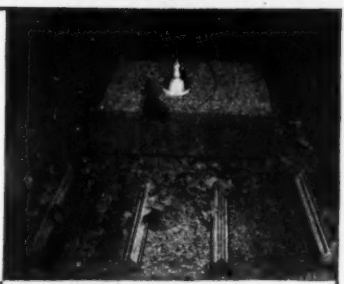
Supplies germ-killing ultraviolet to protect your flock from airborne disease. Means lower mortality, faster growth, better feathering, redder combs, more eggs. A big help in incubators, brooder houses and laying houses. *Must be used in proper equipment.*

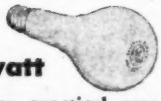




G-E Projector lamp

Combines lamp and reflector for lighting your yard. Makes after-dark chores easier. Helps prevent accidents and protects against prowlers. Quick to install.





G-E 150-watt

Has many practical uses on the farm. Put it in better sight lamps for comfortable, eye-saving light to make figuring simpler, reading easier.

G-E Heat lamp

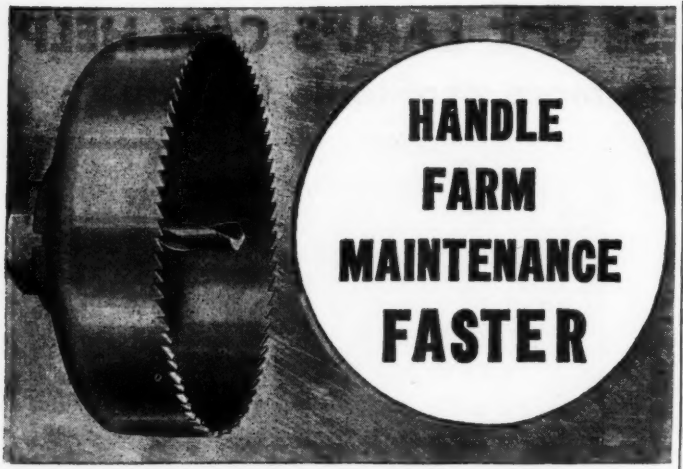
Suspended over the feeders, this lamp encourages baby chicks to eat, keeps them warm and litter dry (particularly important with turkey poults). Good for brooders, too.

The constant aim of General Electric Lamp Research is to make

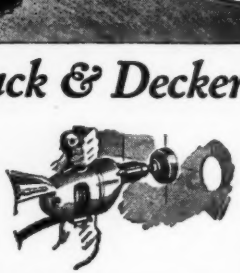
G-E LAMPS

Stay Brighter Longer!

GENERAL ELECTRIC



. . . with Black & Decker Hole Saws



Black & Decker Hole Saws cut clean, round holes—save you time and money on countless farm repair and maintenance jobs. Such jobs as modernizing buildings . . . laying new piping . . . changing wiring . . . repairing machines, trucks and tractors . . . putting new accessories on equipment . . . and many others. And, by short-cutting these jobs, you have more time for profitable farm work!

Drive them with Black & Decker or any other portable electric drill. Black & Decker Hole Saws are made in 27 different sizes to cut holes from ¾" to 4" in any material a hacksaw will cut . . . *a lot faster!* See your nearby Black & Decker Distributor about your Hole Saw needs. For a complete catalog of more than 100 Portable Electric Tools, write to: The Black & Decker Mfg. Co., 655 Pennsylvania Ave., Towson 4, Md.

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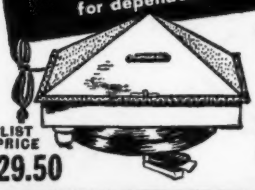

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All features of the latest brooding equipment **PLUS GENERAL ELECTRIC** germicidal irradiation of air which is forced into brooder. Heat supplied by famed **CALROD HEAT UNIT** and uniformly spread by engineered air circulating blower system. Savings in initial purchase price and transportation charges as hover is not included and may be built by user (or purchased separately). Simple instructions furnished showing detailed manufacture of 2300 sq. in. hover.

Maximum Efficiency — Low Cost — Economical Operation. Available through authorized wholesalers and dealers.

THE TRUMBULL ELECTRIC MFG. CO PLAINVILLE, CONN.

Small Milk Pasteurizers

Every now and then we receive an inquiry from a reader about where he can obtain a small electric milk pasteurizer. These inquiries usually come from dairymen in small towns selling milk from herds of 2 to 10 cows. Some are from farmers who wish to pasteurize milk for their own use.

So far as we know there are no 5 to 20 gallon pasteurizers of any kind—electric or otherwise—available to the small dairyman. There are 50 gallon batch pasteurizers available using hot water or steam heat, but the cost of these pasteurizers with their necessary controls and the recording instruments which Health Departments require is prohibitive for small town dairymen.

Small Producer Outside Realm of Present Health Rules

It is not a difficult matter to design an effective milk pasteurizer. The difficulty is that the Health Department rules have been set up for big producers in order to make certain that consumers in big cities get milk which is properly pasteurized and safe. There is inspection to see that it is done. But the very desirable safeguarding of the big market leaves the little place entirely outside the realm. It is a bad situation, too, for there has been a considerable number of cases of undulant fever and other milk-borne diseases in some places using raw milk. If the country consumers demand protection, *something could be done* by Health Departments to enable the small producer to pasteurize milk without letting down the bars on the big producers.

Before the war, development work was done by the Maryland Experiment Station on a batch type electric pasteurizer. It was ready to be turned over to a manufacturer. At Cornell University a small continuous-flow electric pasteurizer was under development, and the New York State Health Department with a Utica manufacturer was working on a heated milk-cooler type tank for pasteurizing milk in bottles. None of this equipment is available.

The pasteurization of milk for home use is not difficult. At Michigan Agricultural Experiment Station a number of methods were tried. The one which proved best is as follows: Use a 2 quart size double boiler. Put 1 quart of water in the lower container. Heat it until it is boiling vigorously. Then pour either 1 or 2 quarts of unheated milk in

the upper container and place it in the lower container. Keep the water boiling vigorously in the lower container for 10 minutes with the milk container tightly covered. After 10 minutes, remove the top container and cool it and the milk in a large pan of cold water without removing the cover. There should be no scum on the milk and it should not have a cooked flavor. If you want to be more technical and use a thermometer, the milk should be heated above 170° but not hotter than 178°, then immediately cooled. Creaming is inhibited at 170° and you will start getting a cooked flavor at about 178°. Between those temperatures most of the bacteria are effectively destroyed.

We understand that a manufacturer is expecting to put a simple electric home pasteurizer on the market. It has not yet been announced. G. W. K.

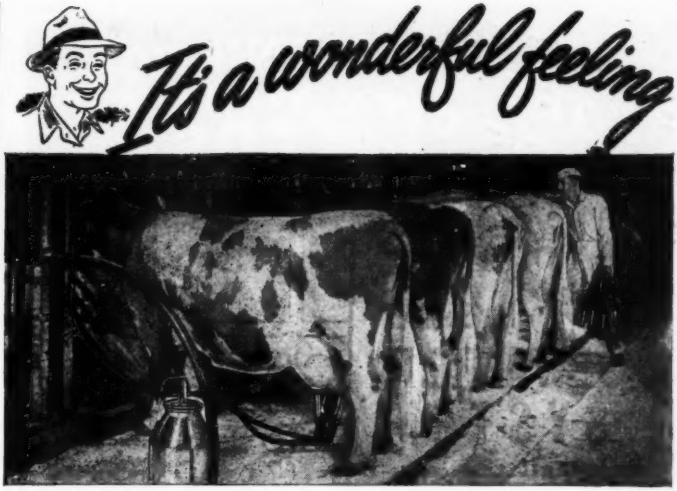
Police Foster Traffic Safety

Beginning May 15th and for an indefinite period, the police of the United States and Canada will conduct a program for reducing motor vehicle fatalities. They will make a safety check including brakes, lights, tires , windshield wipers and horns. The best way to be safe is to check up now to be sure that your car is in good and controllable condition.

Wm. Ritt, a Minnesota electric dealer, says small electric grain elevators are becoming part of the threshing equipment in Minnesota. Farmers are demanding convenient and adequate outlets to handle them.

Courtesy Kentucky Utility News

Don't Do It! It is dangerous to touch any electrical wire or device when you are in the bath tub or your hands or feet are in water. If there should be current leakage in the device you would get the full force of 115 volts through your body to the water, the piping and the ground. People have been killed that way.



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Monarch COAL-WOOD and ELECTRIC RANGE with DUAL OVEN

The perfect farm-kitchen range for year 'round comfort . . . coal-wood on one side . . . electricity on the other side. Large oven is heated by either or both. If coal-wood unit is fired, automatic control regulates amount of electricity (if any) is necessary to maintain required temperature. A decidedly economical combination! See your Monarch dealer, or write.

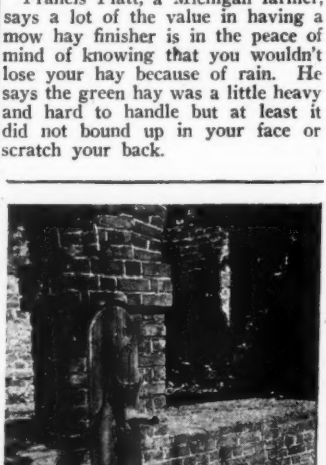
MALLEABLE IRON RANGE CO. 146 Lake St., Beaver Dam, Wisconsin

Egg Cooling Temperatures

The summer cooling of eggs as soon as possible after they are laid and then holding at cool temperatures will maintain a higher quality egg. Under mechanical refrigeration egg quality will be maintained best at about 28°, which is just above the freezing temperature of the egg. This, however, is hardly a practical temperature for short period storage on the farm. Very cold eggs will sweat badly when taken out of storage.

The germ of hatching eggs is also subject to cold injury. The optimum holding temperature is somewhere around 55°, with a safe range from 40°-65°. This range is also a safe and satisfactory one for the temporary holding of market eggs.

Francis Platt, a Michigan farmer, says a lot of the value in having a mow hay finisher is in the peace of mind of knowing that you wouldn't lose your hay because of rain. He says the green hay was a little heavy and hard to handle but at least it did not bound up in your face or scratch your back.



Eighteenth Century Pump — This pump, presumably made before 1880 is in the courtyard of the Pringle house in Charleston, S. C. The old stone watering trough testifies to its age by its weathered condition. The horses were brought in through the iron gate in front of the house and past the watering trough, which is located at the corner of the servant's quarters. Spear-like iron picket fences were provided to restrain pirates who frequented the coastal cities in the early days.

Out of the Cavern

Have you enjoyed Duffy's Cavern? Well, we are bringing Duffy up out of the Cavern so you can have a look at him.

Duffy, Duffy? Sounds a little Irish. Look at him! He's got a twinkle in his eye that goes with that fast firing humor. Guess he must be Irish. He lives out in Pontiac, Illinois, has a wife and ten-year-old daughter, and is District Sales Manager for the Public Service Company of Northern Illinois. He works with dealers in the Pontiac-Kankakee district.

Francis L. Duffy

But that isn't all. He is chairman of the Livingston County Infantile Paralysis Foundation and 1946 chairman of the Drive for funds; also Editor of the Pontiac Rotary Club publication "The Circulator". That's where we first got into Duffy's Cavern, and we liked it.

Duffy,—he is Francis L. Duffy, was born and raised in Cabery, Illinois. His hobbies are photography, fishing, advertising contests, and amateur radio. He's been a "Ham" since 1921; holds present amateur radio call W9DGY. Go into the "Cavern" on page 25. You have met Duffy.

Freezing Techniques for Quality Products

In answer to a question of whether home frozen fruits and vegetables are of good quality, Mrs. Nancy K. Masterman of Cornell University, said it was common to hear people comment that their home frozen products were "Better than Birdseye." She also said it was not necessary to freeze products fast to get good quality. It does not matter so much whether it takes a few minutes or 24 hours to freeze the products, but it is very important to get those products prepared, blanched and cooled down to 32° as quickly as possible after they are harvested to maintain their quality.

Murray Wigsten of Poughkeepsie, N. Y., suggested that it was a good idea to freeze a block of ice in the freezer the day before to use in cooling products in ice-water after blanching.

Someone suggested storing produce in the milk cooler tank until they could be processed and frozen.

How to Get What You Pay for in a WATER SYSTEM

When you buy a water system, make certain you know how much water the pump will actually deliver.

READY-TO-PLUG-IN WATER SYSTEMS

Like the piston-type unit above, many Fairbanks-Morse Water Systems are supplied completely assembled... ready to plug in. Simply connect to supply and distribution lines. No extras to buy, no other connections to make. The unit pictured here comes in a range of popular sizes for shallow wells. An ejector assembly adapts it for service on wells to 70 feet deep.

You won't be misled by theoretical capacity ratings with Fairbanks-Morse Water Systems, for each carries a Performance-Proved Tag which shows the actual capacity as determined by tests in an independent laboratory... your assurance you'll get the performance you pay for.

Everywhere on farms and in homes, Fairbanks-Morse Water Systems are proving that they are built to serve you dependably for many years. Users of 30-year-old Fairbanks-Morse pumps are still getting any replacement parts they may need.

Get the BEST Type for YOUR Needs

Fairbanks-Morse makes *all* types of water systems, thus your Fairbanks-Morse dealer can recommend, *without bias*, the best one for your own needs. See him now or write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois

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Water Systems • Sump Pumps • Light Plants • "Z" Engines • Hammer Mills
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Electrical Housekeeping

Edited by **GAIL MEREDITH**

A Short Cut to
Soups and Souffles

A CANNY cook always has an eye out for short cuts. Like a white sauce, for instance. There is a very convenient short cut to many good dishes.

A white sauce is easy to make, too. Deceptively easy, I might say. All you have to do is follow a recipe and keep the heat low. An electric range is ideal for that flexible heat control. You can have a good deal of heat to start with while you're melting the shortening, stirring in the flour, and bringing the milk to steaming, and then you can cut it off and finish the cooking on a very low heat while you are stirring, stirring that sauce till it is smooth as cream.

After you have lived with an electric range for a while, you will know just when you can turn the electricity off entirely and finish the stirring—and many another cooking process—with the heat that remains in the unit.

Forehanded cooks are given to making up a double or triple recipe that they can keep in the refrigerator for meals ahead. With a supply like this, making a nourishing, appetizing soup is a short job.

Potato Soup

To make a substantial potato soup, peel and slice three medium sized potatoes. Put half a cup of water in a sauce pan that just covers a small unit. Turn the switch to High and bring the water to a boil quickly. Drop in the potatoes as soon as the water is boiling. Wait a minute till it boils again, then turn the switch to the lowest setting that will keep the steam rising. While the potatoes cook, measure out two cups of your white sauce and leave it on the kitchen table to lose its refrigerator chill. When the potatoes are done, mash them fine and smooth with your electric mixer, beating into them the little potato water left in the pan.

Add the potatoes to the white sauce and cook them together on very low heat until they are thoroughly combined. Pepper lightly. Sprinkle a pinch of marjoram over the top. Is it too early to get young green onions where you live? If it isn't, chop up a cup of them, stems and all, and add them to the soup. Let the pan stand on the unit with the current off. The heat that remains will be enough to blend all the flavors for the eating.

If your folks turn up their noses at onions—which heaven forbid—and you want to make your soup extra hearty, add a few shavings of cheese. Just enough to give a hint of taste and color. Then snip off a few sprigs of parsley and mince them fine for decoration before you carry the soup proudly to the table in your grandmother's big tureen.

You can have any temperature you need in the oven, and low, low heat in a unit on the top of the stove to keep celery soup simmering.

White Sauce, Basis of Celery and Spinach Soups

Celery soup and spinach soup begin with a white sauce. For the first you add a cup of cooked, diced celery, a teaspoon of grated onion, a little paprika and just the lightest dash of pepper to two cups of heavy white sauce. Thin the soup to the proper consistency with the water in which you cooked the celery, then put it back on the range with just enough heat to keep the soup simmering gently for half an hour.

For a spinach soup that you can make when spinach grows again, cook two pounds of well washed spinach in a tightly covered sauce pan six minutes. Put it through a sieve and add it to the white sauce with grated onion for flavor and a sprinkling of paprika for color.

If you keep a supply of white sauce on hand, it may be heavier than you need for some soups. You can remedy that by adding milk to the soup slowly and stirring it well to combine it with the other ingredients.

Creamed potatoes should be a favorite dish at your house if you cover diced baked potatoes with a white sauce and let them cook for a long, long time on the lowest heat that will keep the sauce simmering.

Serve them with a square of butter hoarded for just such a contingency, and melting in slow yellow runnels over the top.

For a cheese sauce that will enhance the taste appeal and increase the food value of these potatoes, add a cup of grated cheese to two cups of white sauce. You can change the character of this dish still further by putting the potatoes into a casserole just before serving, covering the top with bread crumbs, dotted with butter if you can spare it, and slipping the dish under the broiler in the oven of your electric range just long enough to toast the crumbs a delicate brown.

A white sauce with cod fish, or two chopped hard cooked eggs cut up in it is grand to serve with baked potatoes or over toast for a quicker meal. Watch the seasoning when you use sauces like this. Have enough salt, just a speck of pepper, and be fairly lavish with paprika or chopped parsley for color.

Souffles Exacting as to Heat Requirements

Many souffles start with a white sauce. And I hope you do not go around thinking souffles are hard to make. They are easy to make but exacting about heat. That needn't worry you if you cook on an electric range. You can give a souffle precisely the heat it demands with no more work than setting the dial and turning the switch.

A cheese or salmon souffle is a delicacy for any time of year. Flake salmon to make two cups. Add it to a cup of medium white sauce. Add extra seasoning to your taste, and stir in the beaten yolks of three eggs. Put the three egg whites in the small bowl of your mixer and beat them stiff, folding them in at the last. Pour the souffle into a buttered casserole. Sprinkling the top with buttered crumbs is a neat trick. Bake until firm in a 350 degree oven.

Serve at once. Serve, I say, at once.

Diathermic Blanching

Some experimental work has been in progress at the Agricultural Experiment Station at Geneva, N. Y. on the blanching of vegetables for canning or freezing by passing a high frequency current through them. The advantage of such a process would be to heat the vegetables on the inside as fast as on the surface and thus reduce the blanching time and possibly improve the quality and save vitamins. The method offers promise. It is still in the experimental stage and no commercial equipment for doing it is available.

Yours for years of tasty toast!

You'll enjoy years and years of golden-crisp toast goodness with a "Toastmaster" toaster. It's the *dependable* toaster. Take the word of Thomas G. Rabon of Tulsa, Okla., who says:

"Believe it or not, we figure we have made 65,000 slices of toast with our 'Toastmaster' toaster. A wedding gift in 1929—and *still* our faithful servant!"

What makes the "Toastmaster" toaster *so* dependable? First, it is built of time-tested materials, skillfully put together by craftsmen who have at their finger tips *twenty-five* years of automatic toaster experience. In addition, it meets every test the *originators* of automatic toasting can devise to assure the highest quality. Finally, every toaster must make perfect toast before it leaves the factory.

You've wanted a new electric toaster for a long time. Be sure you get the one that's best—that's cheapest in the long run. Be sure it's a *dependable* "Toastmaster"* toaster!

TOASTMASTER *Automatic Toasters*

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VAC-U-GLASS MILKER!

So Easy!

What could be easier on your cows than this scientifically designed, field tested vacuum in the pail milker that features individually adjustable vacuum for each cow. Now you can set the vacuum for the "hard" and "easy" to milk cows, instantly! There's a vacuum gauge for each cow!

So Clean!

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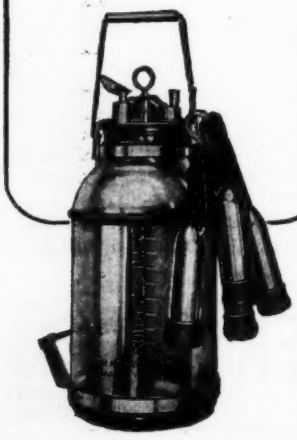
It's the achievement of 1946 . . . a product of the Ben H. Anderson Mfg. Co., Madison 3, Wis., U. S. A., Dept. 403.

See Your Dealer!



When You Wash A Blanket

THE DAY Choose a warm day with a little breeze for washing blankets.

THE WATER Use soft water. If the water on your farm is hard, add a dependable borax softener to each machine full. Remember that softeners take time to do their work, so wait a little and skim off the curds before you add the soap or put the blanket into fresh water for the rinses.

Have the water luke warm. 100 degrees F. is about right. Keep the water at the same temperature for the washing and the rinsings.

Use a mild soap. Enough to make a thick creamy lather.

PROCEDURE Shake the blanket gently but thoroughly. Wet it all over. here should be enough water in the tub of the machine to cover the blanket completely.

Run the machine two or three minutes. Not longer. Put the blanket through the wringer or into the centrifugal dryer to spin out the soapy water, before you drain the water out of the machine. Unless the wringer has an automatic control, release the tension to relieve the pressure on the blanket.

Do not overload the washing machine. The manufacturers say that five or six pounds is a full load for blanket washing. This may be one large or two small blankets.

If the blanket is pretty well soiled, it may need a second washing in suds. Perhaps brushing the binding on stubborn spots with a soft brush and plenty of suds may finish the cleaning. Some women like to do this brushing before the blanket goes into the machine.

Rinse the blanket three times in

• • • • • • • • • • (More on page 24)

MODEL 65 — Operates on 110 V AC 60 Cycle or 6 Volt Dry or Storage Battery. Priced $9.95 and up.

Famous HOL-DEM electric fence controllers can be shipped from stock. Fastest selling controllers on the market. All types for all purposes. Low cost. Self-contained.

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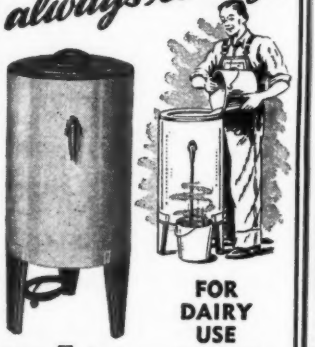

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Have plenty of hot water at all times—for only a few cents a day! Always full—can't run dry. 10-gallon heavy gauge copper tank is permanent. Quick-heating 600-watt element, automatically controlled . . . nothing to forget. Thick insulation holds in heat. Splash-proof bowl at easy height for pouring. Write for full information.

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9267
SIZES
12 - 20
30 - 40

4799
SIZES
32 - 52

Easy Sewi..

Pattern 9267—Wrap-and-tie the sash-belt to give you a doll-like waist! Pattern is just three pieces. Pattern for applique included. Sizes 12-20, 30-40. Size 16, 3 yards 35-inch.

Pattern 4799—Easy-to-sew! Straight seams, back and front. No sleeves to set in! Sizes 32-52. Size 36, 3 yards 35-inch, ½ yard trim.

15c for the New Spring Pattern Book. Directions for bag-on-belt right in the book.

Send all orders (in coins) to ELECTRICITY ON THE FARM, Pattern Dept., Box 196, 243 W. 17th Street, New York, 11, New York.

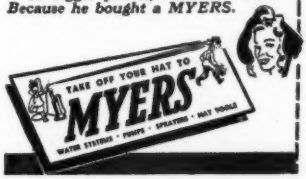
RUNNING WATER SAVES TIME NEEDED FOR SPRING CROPS!

Myers Water Systems will save millions of hours on busy farms this Spring while increasing production of milk, meat and eggs. Time-study records show 350 hours of work a year saved on one farm by an electric pump; 335 miles of water hauling annually eliminated on another farm. Big savings everywhere with running water!

Many types and sizes of quality water systems are built by Myers. Advanced design and construction of the new "H" Series *Ejecto* reduces the cost — gives you advantages in both performance and price. Don't buy a water system until you see the complete Myers line.

Ask your Myers dealer for free Jack and Jill book. Mail the coupon for new catalog on water systems.

When day is done, and night's begun
Jack thinks, as he retires,
Of bigger profits, much less work
Because he bought a MYERS.



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You can select a Jacobsen model designed for your individual needs, at a cost lower than you might suppose.

Five different units, in sizes from ¼ to 1 h.p. Shallow-well and deep-well models — single-pipe and two-pipe jet pumps.

Also, the Jacobsen shallow-well reciprocating pump for cistern, lakes, springs or streams. Capacity, 300 gallons per hour.

● With the Jacobsen jet-type water system you can install your pump away from the well, in your basement or farm building.

Jacobsen
MANUFACTURING COMPANY
RACINE, WISCONSIN
MANUFACTURER FOR OVER A QUARTER OF A CENTURY OF THE FAMOUS JACOBSEN POWER LAWN MOWERS

When You Wash

. . . . . (Here from page 22)

soft warm water. Make each rinsing short, but get all the soap out of the blanket.

DRYING If you have parallel lines a foot or two apart, hang the blanket over two of these. This will let the air reach all of the blanket more easily. If you must hang the blanket on a single line, wind the line first with an old sheet and hang the blanket lengthwise over it. Distribute the weight evenly so there will be as little strain as possible. Use no clothes pins, and hang the blanket in the shade, not in direct sunlight.

Two pairs of hands are better than one for hanging blankets. Perhaps you can plan the washing for a time when you can have some one to help you get the blanket over the line.

Turn the blanket over when it is partly dry. This will hasten the drying. Before you take it from the line, brush it gently to fluff up the nap and get off any loose lint.

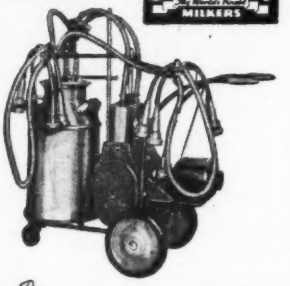
New Spring Pattern Book

It's spring again! You'll know all the answers to your wardrobe questionnaire after looking through our new SPRING PATTERN BOOK. The problems of line (neck, waist, hip and hem); cut, sleeve and collar styles; and all the little details that express 1946 are solved for you. This pattern book includes ensemble — news, frocks for dress and casual wear, the prettiest in prints, young teen-timer trends, items of interest to Sonny and Dad, soap

'n' water styles, house cottons, lingerie . . . and flattering frocks for you to wear while you are awaiting your coming attraction. A free pattern in accessories is printed right in the book. It's the cleverest bag-on-a-belt you ever saw and will rate rave notices from your friends when paired with the simplest frock, sports dress, suit or skirt that you make. FIFTEEN CENTS is the price of this Pattern Book which will prove indispensable to you in your spring sewing.

Send orders with coins enclosed to ELECTRICITY ON THE FARM, 196 Pattern Dept., 243 W. 17th Street, New York 11, N. Y. Allow plenty of time.

Everybody's Happy
WITH A CHORE BOY MILKERS



CHORE BOY IS EASY TO OPERATE

Simple, rugged, precision construction gives long, trouble free life. Powered by either gas or electricity, it's completely portable. Can be operated by a 10-year-old boy.

CHORE BOY IS EASY TO CLEAN

Milks directly into milk can or special pails. Rinses in two minutes. Can be thoroughly cleaned without fuss in a few minutes.

CHORE BOY IS EASY ON THE HERD

Milk flow is visible for 50 feet. Suction can quickly be adjusted to get best production from cow. The machine milks with a gentle calf-like action.

Ask Your Dealer for a Free Demonstration in Your Own Barn

THE CHORE BOY MILKING MACHINE CO.
819 E. KALAMAZOO ST., LANSING 11, MICH.
DISTRIBUTED BY
THE DAIRY EQUIPMENT CO.
LANSING, MICHIGAN • MADISON, WIS.
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WARNER STOCK TANK HEATER
Electric! Economical!

Save Feed & Labor! Water cheap. Milk is about 87% water; beef 60%. In the winter, keep 'em drinking warmed water and YOU KEEP 'EM PAYING.

WARNER Engineering
CHROMALOX Dependable Heat
MINNEAPOLIS-HONEYWELL Control

"add up" to the heater. Sold by big dealers. Send post to 902 S.E. Summ St., for free folde

THE NATIONAL IDEAL CO., TOLEDO 4, OHIO

DUFFY'S CAVERN

APRIL FOOLERY—My lady, be wary of Cupid, and list to the lines of this verse: To let a FOOL KISS you is STUPID—To let a KISS FOOL you is WORSE! . . . Bill, the bachelor sez: "These days it's CHEAPER to be sued for breach of promise than to fit up that new house with furniture." . . . PEANUTS ARE fattening—LOOK what they DO to an ELEPHANT! . . . INSCRIPTION ON A TOMBSTONE: "HERE lies an ATHEIST — ALL dressed up and NO place to GO." . . . CANNIBAL CHIEF: "What are we having for supper tonight?" COOK: "Two OLD MAIDS." CANNIBAL CHIEF: "UGH! LEFT-OVERS AGAIN!" . . . BEST RIDDLE OF THE MONTH: What COLOR are HICCOUGHS? ANSWER: BURPLE. . . . Love song of the APES: "GORILLA MY DREAMS I LOVE YOU." . . . SOME gals can make a FOOL of a fellow in TWO MINUTES—but AAAAH, THOSE TWO MINUTES! . . . It ISN'T easy to tell a COW-SKIN from CALF-SKIN, for the COW is the CALF'S KIN—and the CALF is the COW'S KIN . . . COURTSHIP causes a man to SPOON; MARRIAGE to FORK OVER. . . . St. Peter: "How did YOU get up here?" Newest Arrival: "FLU." . . . A WALLFLOWER is a gal who wears a SWEATER to KEEP WARM. . . . SOME men GROW—OTHERS just SWELL. . . . A CHEAPSKATE doesn't cut a great deal of ICE. . . . Scientists NOW report that there is a vitamin in molasses that prevents the hair from turning grey. But wouldn't it make it a LITTLE difficult to get your hat off? . . . TONSIL-TWISTER—I bought a WOODEN WHISTLE but it WOODEN WHISTLE; I bought a STEEL WHISTLE but STEEL it WOODEN WHISTLE; I bought a LEAD WHISTLE but STEEL they WOODEN LEAD me WHISTLE; I bought a TIN WHISTLE—NOW I TIN WHISTLE! . . . MARY: "I caught my boy friend necking." CARRIE: "I caught MINE that way TOO!" . . . OVERHEARD on a bus: "HE takes HER for granted—and SHE takes HIM for PLENTY." . . . Then there was the story about the famous sculptor who fell in a MUD-PUDDLE — the DIRTY CHISELER! . . . HORSE: An OATS-MOBILE. Besides, he's a curious animal; he EATS BEST when he hasn't a bit in his mouth and the ONLY way he can work is to TURN his back on it. . . . LAST-BLAST LIMERICK—A PRACTICAL fellow named BEEBEE, wished to marry a lady named PHOEBE; But he said "I MUST see, what the FEE is to be, BEFORE PHOEBE BE PHOEBE B. BEEBEE. . . .

SEEYA NEXT MONTH—DUFFY.

• You'll find *more* drill value per dollar in this light, compact general purpose electric tool for all maintenance work. One look tells you this streamlined beauty's got speed, perfect balance, easy handling . . . one demonstration proves it. Only 12½ inches long, weighs only 9 pounds. See your local dealer or write to:

SKILSAW, INC.
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Factory Branches in All Principal Cities

PORTABLE ELECTRIC
SKILTOOLS
MADE BY SKILSAW, INC.

WOODFORD IOWA FREEZELESS HYDRANTS
Year Round Water Service Regardless of Temperature

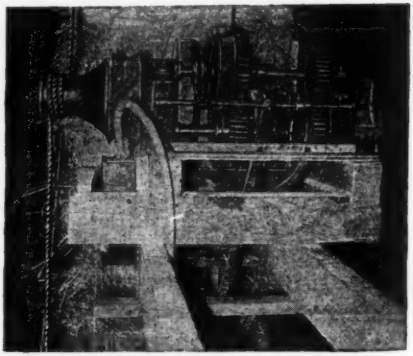
LOCK LEVER — Provides quick, positive control — water is cut off below frost line and hydrant casing drains through vent with each closing operation so they cannot freeze.

TIME TESTED—Many thousands have been giving real satisfaction for more than thirty years.

Order from your preferred source of plumbing supplies.

WOODFORD HYDRANT COMPANY
DES MOINES 16, IOWA

Gipsy-head Hay Hoist



This hay hoist is on the farm of Clarence Ratmyer near Forreston, Illinois. It was not built originally as a hay hoist but is rather a used heavy duty hoist which Mr. Ratmyer picked up and has mounted it cleverly so it saves him labor at haying time. You know ELECTRICITY ON THE FARM says that if an electric hay hoist does not save the labor of a man or a horse at haying time, it is just another questionable gadget. This one saves a man and a horse.

The hoist is mounted on timbers about 10 feet above the driveway which is at the left of the hoist. The gipsy-head sticks out into the drive. In haying season the motor is mounted on the timbers in the foreground. When a load of hay is driven into the barn, the driver can reach over and start the motor. He can also reach the hoisting rope from the load. So he starts the motor, gives the rope three turns around the gipsy-head, pulls it tight, and up goes the load. When it is far enough he loosens or uncoils the rope from the head, trips the fork and pulls it back by hand. It is a short pull.

The important thing here is not the hoist, but the way Mr. Ratmyer has taken what he found available and made it save labor for him. Regular hay hoists can be rigged up just as conveniently.

Protection

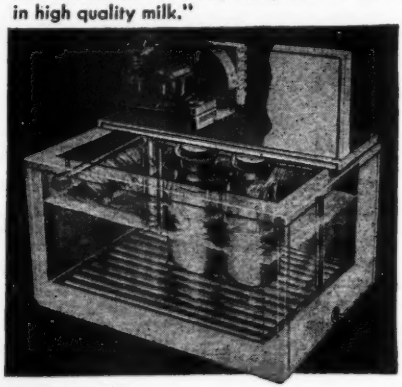
When lightning strikes electric transmission and distribution lines lightning arresters protect valuable apparatus connected to the lines by providing a direct path for the discharge of the excess energy to the ground.

The net national income in the United States dropped from $80 billion in 1929 to $40 billion in 1932, and rose to $80 billion in 1937, and to $160 billion in 1944.

"OUTSTANDING FARMER" RECOMMENDS GRADE A ARCTIC JET COOLING

VOTED MAINE'S OUTSTANDING FARMER of 1940, Fred J. Nutter, Corinna, Me., dairyman, states: "I cool my milk with the Arctic Jet Grade A refrigeration system. I find it a most efficient machine and recommend it to any dairyman interested in high quality milk."

Average 1945 production of 449 lbs. of butter fat makes Mr. Nutter's 50-milker, registered Holstein herd one of the highest producers in the U.S.A.!



ARCTIC JET PROVIDES night and morning "can-top" cooling. Warm, bacteria-laden top milk cooled quickly—whether one or more cans • Efficient, ice-free, agitator coil and extra water ratio furnish "plus" capacity • Unobstructed walls for cleaning and sanitation.

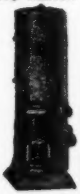
arctic jet

For literature, write Dept. B

THE SARGENT-ROUNDY CORP
Randolph, Vermont

RUNNING WATER SAVES TIME AND WORK

A BURKS Water System will give you running water where you need it—Will help increase milk and egg production — Put meat on hogs and beef faster — Cut chores and give you extra hours for field work.



BURKS WATER SYSTEMS

are famous for dependable service—longer life—and larger capacity. Only one moving part—self-priming—easy to install. Both deep or shallow well systems. Write for catalog and prices now.

Ejector System

DECATUR PUMP CO., 13 Elk St., Decatur 70, Ill.

PAGE Portable Milker

More Milk — More Money
Fast, safe, easy to clean
Milks 15-20 cows an hour with right vacuum. Widely used, simple, sturdy. Write for catalog and dealer's name. Ask about Page Garden Tractor

Pioneer Mfg. Co.
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Debeak — Make Feed Go Further
Feed savings up to 20% reported. Lyon DEBEAKER also stops cannibalism, picking, egg eating, etc. Immediate delivery.

AUTOMATIC BROODER HEATERS
ELECTRICAL POULTRY SUPPLIES
Best values, investigate. Send for FREE CATALOG

LYON RURAL ELECTRIC COMPANY
Dept. EF, San Diego 12, California

Feed Baby Chicks Grain

Some investigators have found that baby chicks started for the first two days on chick-size cracked grain and no mash will get by without the pasting up that so often occurs when the temperature or management methods are not just right. Give them plenty of grit. They will not grow so fast on the grain as on mash but they will catch up by the end of the brooding period. After two days the mash feeding can be started.

Deep, dry litter helps avoid spread of coccidiosis. That means warm, tight floors are necessary.

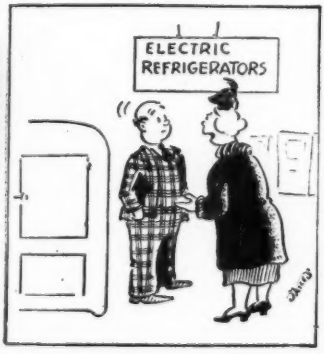
Our Cheapest Hired Hand

"We have an electrified farm. When our friends brag about their small bills, we pride ourselves on the amount of current we use, for every bit of current goes for cooking, heating, pumping, milk cooling, refrigeration and lighting. It's the cheapest hired hand we'll ever have; it doesn't quit, get sick, get up late or have any other bad habits."

R. V. Weil, Pennsylvania

Electric Knife for Ring Rot

Ring rot in potatoes is spread from diseased seed pieces to healthy pieces by the cutting knife. To avoid this, Dr. L. Carl Knorr of Michigan State College has designed a seed cutting knife that will not spread the disease. It is a rotary knife the bottom half of which runs in a bath of water kept at the boiling point by an electric heating element. The blade is motor driven.



"Do you have one that automatically spanks a little boy when he tries to slip food out between meals?"

SAVES WORK, TIME . . . KILLS FLIES FASTER

Now—flip a switch and walk from cow to cow—that's all there's to spraying when you use the Hudson Rival "Lektrik-Spray" with any good insecticide. No more tiresome hand pumping—the powerful motor of the "Lektrik-Spray" does all the work. No fly on or around cows can escape the atomized cloud it produces. Comes with time switch so you can operate it in the barn to kill flies before cows enter—while you do other work. Bring cows into a fly-free barn—send them out protected. Save work and time—have a healthier, better-producing herd. See your dealer *or write for "Lektrik-Spray" folder.*

H. D. HUDSON MANUFACTURING COMPANY
589 E. Illinois St., Chicago 11, Illinois

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Tested and Proved
SPRAYERS AND DUSTERS
HAY TOOLS AND BARN EQUIPMENT
LIVESTOCK EQUIPMENT
FARM VENTILATION EQUIPMENT
POULTRY EQUIPMENT
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CHECK THESE FEATURES:

Saves Money—Tests show electrically sprayed insecticide does better job with no waste.

So Easy to Use—so light (only 9 lbs.)—even a youngster can use it. Saves work.

Built for Lasting Service. Has rugged motor, galvanized tank, chromium spray head.

Paragon Automatic Lighting Controls

For Hen House Lighting
GET MORE EGGS
Per Pound of Feed
Per Hen, Per Month

by longer winter laying days, thru controlled lighting. **Paragon Poultry Time Switches** assure absolute regularity—are dependable—long life—easy to install and adjust. Models for any system of lighting—evening models provide dim roosting time. Powered by self-starting, synchronous motor. Satisfaction guaranteed.

Ask your supply dealer or write for Bulletin 438

PARAGON ELECTRIC CO.
37 W. Van Buren St., CHICAGO 5, ILL.

New! BROWER DISINFECTING TORCH

Can't be beat for disinfecting poultry and hog houses, batteries, yards, etc. Replaces expensive disinfectants. Kills all germs, worm eggs, mites and lice. Also kills green weeds, seeds and all, instantly! Easy to use, safe, FAST (disinfects 1,000 sq. ft. per hr.) Burns kerosene or stove distillate. 4 gal. steel tank. 2 hr. supply. Highly recommended. See Your Dealer, or order direct from this Ad.

$19.95 ONLY F.O.B. QUINCY

BROWER MFG. CO., Box 5830, Quincy, Illinois

World's Largest Line of Poultry Supplies

Quality Hay.....

.....CURED IN THE MOW

Minimum weather worry
23% more leaves, 19% more green color
4 times the carotene, 3 times the Vitamin A
Fan-forced mow ventilation does it. The fan is the key to success. Hartzell can prove 10% extra air. Write today

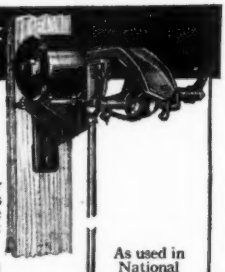
HARTZELL PROPELLER FAN CO.
PIQUA Div. of Castle Hills Corp. OHIO

NOW AVAILABLE THROUGH HARDWARE or FARM SUPPLY DEALERS

STEWART SHEARING MACHINE with CLUTCH BRACKET

This STEWART Electric Shearing Machine is preferred for permanent installation in barns, shearing sheds, at feed lots or wherever electricity is available. It is the type used in the National Shearing Contests at the International Livestock Exposition in Chicago.

Complete with powerful ¼ h.p. 60-cycle 110 volt motor clutch bracket, mounting bracket, 2-section 66-inch jointed shaft, E-B wide handpiece, 2 G287 combs and 4 P2311 wide Diamond cutters. Catalog No. VA-1. Shipping wt. 96 lbs. Price, $72.50. Slightly higher West of Denver.



As used in National Shearing Contests

STEWART SHEARMASTER

Ideal for the farm flock, tagging, shearing wool-blind sheep.

Shearmaster gets 10% more wool than hand blades from same sheep or goats. Fast, easy-to-use. Removes fleece from sheep in a few minutes. Fewer second cuts. Long fibre wool grades better—brings more money. Saves time and work. Powerful, cool motor inside special EASY GRIP handle. Professional type Tension Control. Rugged, built-in durability. Shearmaster is only $26.95 at your dealer's. Slightly higher West of Denver. Write for new Stewart bulletin, "Harvesting the Farm Flock Wool Crop."

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Questions and Answers

Rotary Weed Mower

▶**Question:** *Have heard of some "home made" weed mowers made by using a whirling blade. Do you have any plans or information on the best speed?* P. M., Iowa

▶**Answer:** We do not know about the home made weed mowers to which you refer. A rotary mower was made by the Rotary Mower Co., Brandein Theatre Bldg., Omaha, Neb., before the war. The cutting rotor was about 18" in diameter, ran at 1,750 rpm and was driven by a ¼-hp motor.

How Long Will Frozen Pies Keep?

▶**Question:** *We have just built a new freezer in our basement. I have information regarding the care of meats, but do you have bulletins regarding other foods? How long will pie, bread, cake, etc., keep when preparing for threshers, etc.*
Mrs. A. M. M., Okla.

▶**Answer:** Our company does not put out any publications other than our magazine ELECTRICITY ON THE FARM. We are pleased to pass along to you, however, the information requested about the freezing of pie, bread, cake, etc.

Most of these foods will keep satisfactorily and with practically no deterioration for periods of several months when they are frozen. You can get much valuable information on frozen foods from Cornell University, Ithaca, N. Y. or from the General Electric Foods Research Laboratory, at Bridgeport, Connecticut, the Frigidaire Co., Dayton, O. and from other state colleges and freezer manufacturers.

Size Water Heater to Use

▶**Question:** *I am interested in purchasing an electric water heater for my home, not to be used in connection with dairying, and am wondering if a fifty gallon tank with an automatic single unit would be satisfactory and the most economical? How would it compare with a double unit as to operating cost, other conditions being the same?*
G. W. P., Ill.

▶**Answer:** The size of tank which will give best satisfaction for an

electric water heater will depend upon whether you have a constant current supply, or whether you are on an off-peak rate, and use current only at night.

If you are on an off-peak rate, I would consult the Power Company as to the size heater they would recommend. In Southern New York most of them are around 80 gallons. A 40 or 50 gallon tank would be adequate with continuous power for a family of four or five persons.

There is little difference in the economy of single or double unit tanks. Usually the double unit heater is used where the lower heater is on an off-peak circuit and the upper heater may be on the regular circuit to give a little supplemental heat during the daytime.

Grindstone Speed

▶**Question:** *What is the proper speed to run an 8" grindstone?*

▶**Answer:** In our February issue on page 28, we stated "The surface speed of a grindstone should be between 4000 and 5000 ft per minute. For an 8" stone this would mean a speed of 1900 to 2400 rpm."

These figures are correct for emery wheels and other high speed cutting stones. They are not correct for soft stones, such as natural sandstone, commonly called a grindstone. Such grindstones should be turned at speeds just fast enough so they will not throw water off the periphery of the stone. In the case of an 8" sandstone that might be 150 to 200 rpm.

Electricity vs Oil for Heating

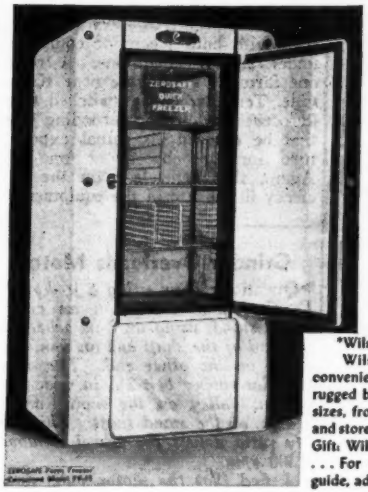
▶**Question:** *Will you please tell me how the electric steam radiator compares in fuel cost with a Florence or other parlor oil burner using kerosene for heating a chick battery room. My electric rate is 3c per kilowatt, oil costs me 9c per gallon.*

R. J. MacA.

▶**Answer:** Theoretically the cost of kerosene for heating at 9c per gallon is much cheaper than electricity at 3c per kilowatt hour. Kerosene contains about 154,000 Btu per gallon while electricity produces about 3,400 Btu per kilowatt hour. On this basis 1,000,000 Btu of heat produced by kerosene would cost 58 cents, whereas the same number of Btu produced by electricity would cost $8.79.

Those theoretical figures, however, do not tell the whole story. The efficiency of heat production with electrical energy is practically 100 per cent. With kerosene it is

WILSON ZEROSAFE
REACH-IN FARM FREEZERS
ARE YEARS AHEAD



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The greatest farm freezer in America
. . . NOW GREATER THAN EVER BEFORE

*Wilson's YEARS OF EXPERIENCE bring you the Wilson-pioneered features of front-opening convenience, real usability, long, efficient life, and rugged beauty in a complete range of farm freezer sizes, from 15 cu. ft. (illus.) to 120 cu. ft., to freeze and store foods for daily use the year around. Special Gift: Wilson Farm Freezer GUIDE to Better Living . . . For your free copy of this valuable freezing guide, address Desk EF-3:

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SMYRNA DELAWARE

The best machine is your best buy!
PLAN ON A SINGER!
• Precision-made parts
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• Singer service always available
• World's leading sewing machine for more than 90 years
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THE 1ST NEED ON THE FARM

For Added Production, Sanitation, Health and Protection!

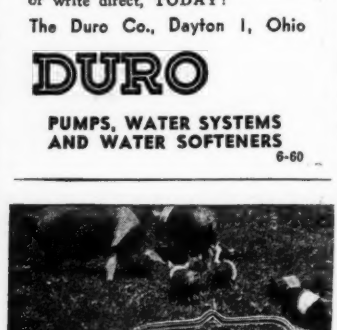
A DURO DEEP WELL PUMP is the farmer's friend . . . by making fresh, running water available to stock and flocks it is a direct aid in increasing production of milk, butterfat and eggs from 6 to 20 per cent! It means improved health . . . protection from fire. Capacities up to 650 gallons per hour! See your dealer or write direct, TODAY!

The Duro Co., Dayton 1, Ohio

DURO

PUMPS, WATER SYSTEMS AND WATER SOFTENERS

6-60



Electro Line

FARM FENCE CONTROLLERS

You can do a better fencing job —with less cost—using Electro-Line controllers. A moderately priced complete line, with a controller for your needs.

ELECTRO-LINE PRODUCTS CORP.
120 N. Broadway • Milwaukee 2, Wis.

very much lower. You also have a greater fire hazard with kerosene, much more labor in caring for and regulating the equipment and the use of some of the oxygen in the building to support combustion.

The exact comparison of cost could only be given after making a trial with both pieces of equipment under similar conditions. I recall one farmer's experience near Knoxville, Tenn., when he switched from kerosene to electric brooding was that he reduced his actual expenditure for fuel by about one-half. Again, that depends upon the efficiency in the use of the equipment.

Grinder Overloads Motor

▶**Question:** *I am using a ½-hp (R. I) Craftsman motor on an emery wheel stand, using an 8-in. wheel on one end of the shaft and an 8-in. wire brush on the other end. The drive is a flat rubber belt 2½ in. wide with a 3-in. pulley on the motor and a 2¼-in. on the stand shaft. This pulley ratio drives the wheel at about 2,300 rpm.*

I find that the motor pulls down quite noticeably with hard grinding and decidedly when applying even normal pressure when using the wire brush. Am I using too large a drive pulley or have I had the misfortune to get a motor that does not develop its rated horsepower? Would you advise using a V-belt in place of the flat, and if so, what width?

K. H. J., Ill.

▶**Answer:** As you increase the diameter of grinding wheels or wire brushes, the power used increases very rapidly. I would say that you could very easily overload a ½-hp motor using an 8-in. wire brush at the speed you are using.

You can increase the efficiency of your drive by using a V-belt. I would suggest using a belt of B section. Be sure your wiring is heavy enough so you do not have a drop in voltage causing your motor to fail to develop its rated power.

Conveyor for Cleaning Hen Houses

▶ **Question:** *I want to build a conveyor to use in cleaning my laying houses. Each room is 20 x 20 ft. with window in front. I throw litter out of windows on to wagon.*

I thought of making a conveyor about 20 ft long, using endless belt with cleats on it—belt 1 or 1½ ft. wide, throwing litter on belt with shovel.

The conveyor would have to be light in weight so I could move it from room to room by myself. What

INTER-MATIC TIME SWITCH

$7.50 LIST
F.O.B. CHICAGO
115 V., 60 Cycle

FOR AUTOMATIC TIME CONTROL

- Poultry house lights
- Yard lights
- Electric fences
- Pumps
- Haydryers

Write for catalog and nearest distributor

INTERNATIONAL REGISTER CO.
Dept. 46C
2624 W. Washington Boulevard
Chicago 12, Illinois

ESS BATTERY CHARGER

Operates off 115 volts, 50 or 60 cycles.

Keeps your car, tractor and electric fence 6 volt storage batteries fully charged. Not necessary to remove battery while charging.
Max. charging rate 5 amperes, automatically tapering to a safe charging rate of 2 amperes.
Write, wire or phone for complete information.

Electric Service Systems Inc.
641 Cleveland St. N.E., Minneapolis 13, Minn.

SANI-MATIC
ELECTRIC
WATER HEATER
FOR THE MILK HOUSE

Exclusive Advantages:

- TEN FULL GALLONS* of HOT WATER available SIX TIMES DAILY and the LAST DROP is as HOT AS THE FIRST.
- EASY ACCESS FOR CLEANING.

*Also 18 Gallon size available.

Write today for descriptive folder.

THE SCHLUETER CO
JANESVILLE, WISCONSIN

kind of belt should I use, and what hp motor? At what speed should belt be run and how can I reduce speed of motor without too many belts and pulleys?

F. J. M., Va.

▶**Answer:** I would recommend a light weight rubber conveyor belt without cleats unless you are going to be using the conveyor at an angle of more than about 30 degrees.

There are many manufacturers of conveyor belts and I am giving you the names of three below. If you will state your problem to them they may have a better recommendation to make:

Mercer Rubber Co., 941 Williamson St., Hamilton Square, N. J.

Raybestos-Manhattan, Inc., Manheim, Pa.

Goodall Rubber Co., 7 S. 36th St., Philadelphia, Pa.

A good speed for your conveyor belt would be somewhere between 80 and 100 ft. per minute. Perhaps the simplest method of reducing speed is to use a jack shaft on the under side of your conveyor. To get a speed of 90 ft. per minute you would need a 2-in. pulley on the motor driving a 10-in. pulley on the jack shaft with a 3-in. pulley on the other end of the jack shaft driving a 12-in. pulley on the roller. The roller should be 4-in. in diameter.

If you use a belt 1 ft. wide, which should be adequate and easier to handle than a wider one, a ⅓ hp motor would handle the job.

Small Stone Burr Mills

▶**Question:** *Can you recommend any small electrically powered stone burr grain mills for use on a small farm for grinding feeds and also cereals for human consumption?*

T. G. K., Md.

▶**Answer:** The Meadows Mill Co., North Wilkesboro, N. C., makes a 12" and a 16" stone burr mill. The smaller one takes a 2- or 3-hp motor and the larger one a 5-hp motor. Orders on hand will take all of the 1946 production. The Sprout Waldron Co., Muncy, Pa., makes larger size stone burr mills, but they too are far behind on orders.

Immersion Water Heater

▶**Question:** *Is there something to put in a washer to heat water with electricity?* M. F., Ohio.

▶**Answer:** Some electric heaters of about 1,300 watts capacity have been made for heating water in tubs, pails and milk cans. The process however is slow with that size heater. It would take probably two hours to heat ten gallons of

"THE CASE OF THE MISSING AMPERES"

On plug type welders built for the farm the plugs are often 10 to 25 amperes apart and the amperes between are lost.

SOLUTION: ***GET A MILLER—THE WELDER WITH NO MISSING AMPERES***

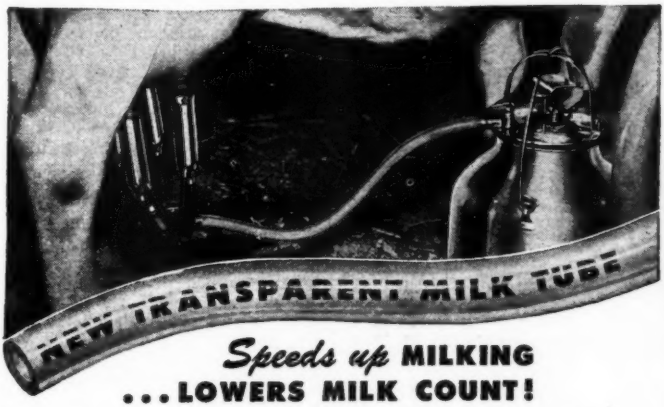
The new Miller Farm Welder, with "SWING-LOCK" heat selector, produces an infinite number of ampere settings. You get the correct heat for each job. There are no missing amperes. The Miller Farm Welder meets all requirements for operation on rural and REA power systems. The Miller has the high degree of Power Factor Correction so important in a Farm Welder.

See the new Miller—Use the new Miller. It is on display at your dealer's store

ELECTRIC miller WELDERS

Miller Farm Welders

MILLER ELECTRIC MANUFACTURING COMPANY RICHMOND, INDIANA



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...LOWERS MILK COUNT!

RITE-WAY is first again!... First to give you the newest miracle of science — a milk tube you can see through. Just a glance saves a dozen steps, helps you milk more cows in less time, with less effort. What's more, the new transparent tube helps lower the milk count . . . It's smooth as glass, inside and out, amazingly easy to clean.

More than 100,000 dairy farmers use the Rite-Way milking method. See your Rite-Way dealer. Write for free booklet on Rite-Way Fast Milking.

America's Fast Milker

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1241 Belmont Ave., Dept. T, Chicago, 13, Ill.

Branches: Syracuse, N. Y.; Oklahoma City, Okla., Atlanta, Ga.

Coast Distributor: Dairy Equipment Co., Oakland, Cal.

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WE HAVE A NEW HIRED HAND

He works day and night for a dollar a month. He pumps and carries all our water in house and barn. He saves his cost every year in time and work and earns more profit in milk and eggs. He helps keep the children clean and healthy, and he's always ready to help put out a fire. He never gets sick or lies down on the job. He is our

BERKELEY WATER SYSTEM

BERKELEY PUMP COMPANY
819 Bancroft Way, Berkeley, Cal.
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FORDS MILKERS

Track model; easy to install; no pipelines. ¼ H.P. motor.

Portable; milks anywhere; gas or electric.

FAST milking . . . natural, controlled suction . . . few parts . . . easy to clean in 5 minutes . . . simple to operate . . . "never fail" construction . . . outstanding design. GUARANTEED.

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ONLY **$11.00** F.O.B. Quincy Satisfaction Guaranteed

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World's Largest Line of Poultry Supplies

water from 50 to 120 degrees.

The only really satisfactory way to heat water electrically for domestic use is to have an insulated tank in which the water can be heated gradually and stored.

Furnace Cleaning Unit

▶**Question:** *Can you give me some suggestion what to use or how to make a cleaner to clean furnaces? Something on the order of a vacuum cleaner, only with a little larger motor.* O. B. O., Pa.

▶**Answer:** The Kent Company, Inc., 105 Canal St., Rome, N. Y., make vacuum cleaners for cleaning furnaces.

What Size Welder?

. . . . . (Here from page 14)

can apply that same reasoning to a welder. If you have a big shop where you are covering a thousand jobs and many heavy ones, it may pay you to have a big welder. But few farm shops are like that. A smaller welder will "do the plowing" and "pull the stumps", but it will take a little longer and possibly a little more skill.

A large welder that uses welding rods of ⅜" diameter will apply metal faster than a farm welder that uses 5/32" rods, but it will not necessarily do a better job. It may mean one time over instead of four.

The actual time applying metal on farm jobs is so small, however, as to be of little importance. What takes the time is preparing the job for welding—cleaning it, grooving it, anchoring it in place—and getting the welder set up and ready to use.

You may ask, "If a 130 amp welder will do the farm jobs instead of a 300 amp welder, then why not a 40 amp welder? It can be done, just as you can pull stumps with a hand puller, and plow with a walking plow. You must just have a proper sense of proportion mechanically and economically. A West Virginia farmer has welded plowshares, railroad irons and made a truck trailer with a 40 amp welder. Now he has more machinery to care for, and he wants a somewhat larger welder, but not a 300 amp size.

After much study of jobs to be done, electrodes available for different purposes, rural line requirements and costs, the various groups throughout the United States who were interested have settled upon 130 amp and 180 amp welders as the sizes best suited to general farm repair work. You will do well to consider carefully before going contrary to these recommendations.

The "Fireball" Kills Weeds! Holds Stock! Safe!

Wisconsin and Oregon Approved

MODERN ELECTRONIC FENCING

Effective shock; kills weeds; low operating cost; automatic weather adjustment; visible indicator tube; ground indicator; absolute safety; maximum reliability.

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Specialists in farm electrical equipment for 20 years

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NO. SPB-12 with 12" REFLECTOR—$3.00 EA.
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The **EXTRA HAND for your Haying**

IRELAND *Farm* **HOIST**

Saves half your time

Replaces tractor or team for unloading. 2 H. P motor or tractor pulley lifts up to ½ ton 40 feet per minute. Limited production . . . order now. See your DEALER or write for full information.

Bennett-Ireland, Inc., 446 Marsh St., Norwich, N. Y.

Grind YOUR OWN FEED
AT A FRACTION OF THE COST

Yes, you can slash grinding costs when you have Viking Electric Hammer Mill. And a Viking saves labor and time—grinds grain automatically while you do other work. Just put grain in the bin and snap switch. Get added nutritive value of grain ground fresh every day. Average grinding costs cent per 100 pounds. Fully guaranteed. Write for full description and pictures of Viking Mills in actual operation. No obligation. Write today.

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VIKING MANUFACTURING COMPANY
MANHATTAN 4, KANS. JACKSON 4, MICH.

"That's a Great Crop Booster!"

A Peerless Deep Well Turbine Pump gives you 4-way protection—(1) Freedom from drought; (2) Pure water for your stock and home use; (3) Elimination of water shortage at the peak of dry periods; (4) Dependability of supply without fear of breakdowns. For irrigation, a Peerless Turbine Pump pays its way right from the start. It's real crop insurance. Capacities: 10 to 30,000 gallons per minute.

PEERLESS
PUMP DIVISION
Food Machinery Corporation
Los Angeles 31, Cal. Quincy, Ill.
Canton 6, Ohio

What's New

Electric Fence Gate

A new-type "lever-lock" electric

fence gate pulls the wire tight with 11" lever, locking the gate securely. The insulators fasten securely to gate posts with 4-inch lag screws. Accessories Mfg. Co., Chicago 40, Ill.

Automobile Radio Phones

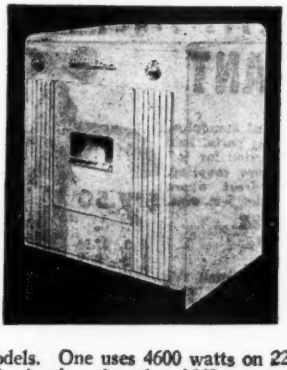
Philco Corp. plans to produce mobile FM radio telephone equipment to provide dial telephone service in automobiles, etc. and for use on farms. It is still in the future. No equipment is available yet.

Roasters Again

Westinghouse announces its De-Luxe Roaster-Oven back in production. It is 23½" x 15¾" x 12 9/16" with capacity of 18 quarts. Enamel bottom, aluminum lid, heat-proof dishes, automatic control.

Hamilton Clothes Dryer

The Hamilton Mfg. Co., Two Rivers, Wis., announces a new automatic clothes dryer. There are two



models. One uses 4600 watts on 220 volt circuits; the other 1660 watts on 110 volts. Both dryers hold 9

SUMMER or WINTER A
VOGEL (PATENTED) FROST-PROOF HYDRANT NEVER FAILS

Reduce fire hazard . . . Improve live stock health . . . Increase operating efficiency with Vogel Frost-Proof Hydrants. More than 100,000 in use.

See your nearest Plumbing supply house or write us direct for complete information.

JOSEPH A. VOGEL COMPANY
Wilmington 99, Delaware

When you buy a hi-line electric fence controller, it pays to remember

PRIME *means* MORE SHOCK

All the shock you need to hold animals — the effective shock of *alternating* current — engineered for utmost control and safety—backed by Prime's 12 years of leadership. Make more money—farm the modern way — fence with Prime. See your Prime dealer for hi-line or battery controllers.

The Prime Mfg. Co.
Milwaukee, Wisconsin

"Repair your Equipment with the Tools that Built It!"

Thor ELECTRIC TOOLS

Now you can get the same dependable *Thor* portable electric drills, grinders, saws and other tools that have been standard among leading manufacturers of farm equipment for more than fifty years. Built to stand up on the hardest factory jobs, *Thor* tools last longer . . . cost less to operate and keep up. Every *Thor* tool has an extra-capacity motor; anti-friction bearings throughout; shock-resistant housing. *Thor* tools will last many years to save you time and money on hundreds of equipment repair and farm building construction jobs. Write for catalog.

Ask your nearby Thor dealer or write to:

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FACTORY BRANCHES IN ALL PRINCIPAL CITIES

PACKED WITH POWER . . . BUILT TO LAST A LIFETIME!

DRILL STAND *Mounted in a Thor Drill Stand, this ½" cap. tool gives you a workshop "drill press."*

ELECTRIC DRILLS *Capacities up to 1½-inch*

BENCH GRINDER *Smooth running, ½ H.P. motor. One 6" dia. grinding wheel and one wire brush.*

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HANDY WATER for STOCK and FIRE PROTECTION

Galvanized iron top body and standpipe, brass lower body and working parts, lead waste included. Inlet connection for ¾" iron pipe, outlet for ¾" hose coupling. Order sizes to depth of frost where installed. For 3-ft. burial, order 5-ft. size. **$7.50**

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IXL AIR CUSHIONED ELIMINATOR

Price $2.50 Plus shipping charges.

If you have a water-hammer condition, install this eliminator before damage is done. Bottom tapped ½" iron pipe size for hot or cold water lines.

5 ft. $7.50
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pounds of dry clothes. The 4600 w. units dries ready for ironing in 15 to 25 min. and completely dry in 30 to 35 min. The 1660 w. unit takes about three times as long. White enamel finish; 39" x 31" x 27½" deep.

Dual-Purpose Fence Tester

This new winking "Firefly" indicator serves in two ways: 1. As a stationary signal. 2. As a portable tester.

Placed at points where you will be passing frequently, the visible,

weatherproof light provides a continuous check. It clips on the fence with end of wire grounded. The tester also may be used for making spot tests to find shorts, leaks and open circuits. Available through hardware and electric supply stores, the firefly tester is being introduced by Accessories Mfg. Co., Chicago 40, Ill.

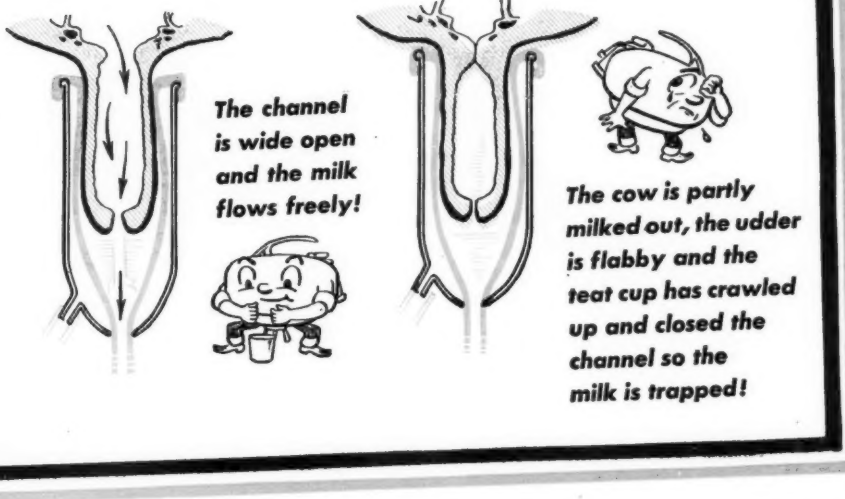
New Publications

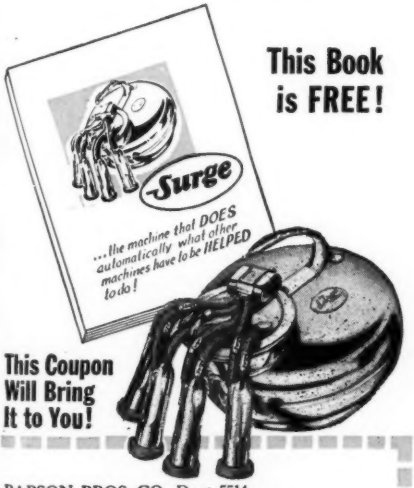
- JIM'S ADVENTURE. A 20 p. 8½" x 11" colored cartoon book giving a story of the development of electricity from Franklin's kite to present-day generation and transmission equipment. Educational and entertaining. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
- HOW TO CHOOSE A STOKER. A 28 p booklet, profusely illustrated and showing the construction and workings of domestic coal stokers. Whiting Stoker Sales Co., 11 S. LaSalle St., Chicago.
- Foods—Enriched, Restored, Fortified. USDA AIS-39, Washington, D. C. A 16 p. bulletin from the Bur. of Human Nutrition & H. E., dealing with bread and flour, cereal, fortified oleomargarine, vitamin D milk and iodized salt. For teachers and groups working on nutrition studies.

The higher the standards of nutrition in the foods we eat, the greater the need for refrigeration.

— 9m proud 9 am a farmer! —

CREEPING Teat Cups Shut off the Flow and Leave Milk Trapped in the Udder


The channel is wide open and the milk flows freely!
The cow is partly milked out, the udder is flabby and the teat cup has crawled up and closed the channel so the milk is trapped!



This Book is FREE!

This Coupon Will Bring It to You!

You can avoid this with any machine if you are right there at the right time to bear down on the claw and hold the teat cups down.

A calf puts on TUG & PULL to stretch the udder and let the trapped milk get out. A good Hand Milker stretches the udder for the same reason.

The Surge milks with an automatic TUG & PULL and the increasing weight of the milk in the pail causes it to tug harder and harder as the cow milks out. This udder stretching tug and pull gets the trapped milk out of the udder and into the pail. You don't have to help a Surge milk your cows.

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If Electricity Cost Nothing to Make

EVEN if electricity could be made for nothing—the cost of using it in your home would not be greatly changed. A large part of what you pay for electric light and home convenience is in the cost of *delivering it to your fingertips after* it is made — and *keeping it there every minute.*

To properly serve you, there is necessary a vast investment in the lines and equipment to carry, control and regulate. Money must be spent to maintain all of these lines and this equipment at a high standard for dependable service. An organization must be on duty day and night.

Whether waterpower or steampower — the principle is the same. The largest part of the cost is not in the making, but the delivery and maintenance of the service for any and every need, whenever you wish it.

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